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1932

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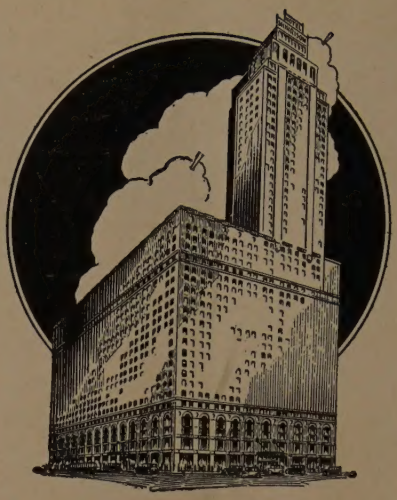

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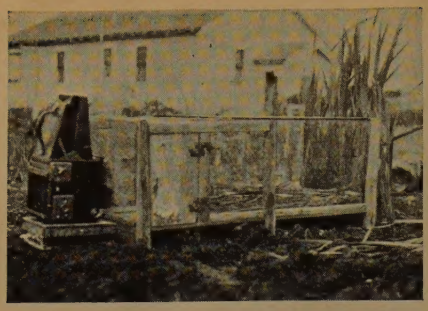


The photo cage set up with a Graflex, and with a muskrat as subject

SMALL ANIMAL PHOTO-CAGE

BY W. M. RUSH

Photographing small wild animals in their natural haunts presents many difficulties to the photographer and the scarcity of good pictures of these animals has led to a number of ingenious devices whereby some of the natural obstacles are overcome.

Cameras set with a string so that the animal itself releases the shutter and takes its

The pack rat is a good subject and does not try to escape

own photo has resulted in remarkable photographs. Tethering the animal by one foot with a cord is another favorite method. Some wild animals readily become tame and make rather docile pets, and are thus easily photographed.

The writer designed a photo-cage some few years ago and has had very satisfactory results with such animals as the pack rat, pine squirrel, ground squirrel, woodchuck, muskrat, various mice, cottontail rabbit, mink and weasel. This cage is simply a floor and a wooden frame work supporting glass sides and a glass top. One end is of woven wire and the camera is set at this end.

Cottontail rabbit photographed in the cage against a natural background

Usually the animal stays at the end opposite the woven wire, but if it chooses otherwise and persists in investigating the camera lens, a bit of food placed in the other end will keep it within the range of the camera.

A scale of distances in inches is marked off on the outside of the cage so that an ordinary camera with a portrait attachment can be used and the focus determined cor-

The white-footed mouse can be made to look at home in the cage

rectly. A side door to admit the subject completes the construction of the cage.

A suitable background and setting is arranged for the subject and by being careful with the shadows cast by the framework the photos taken are good representations of the animal in its natural surroundings.

Some of the best results have been obtained with a 3A Special Kodak with a portrait attachment. As the cage is of such dimensions that the film takes in all of the field it is unnecessary to look through the view finder and the subject can be watched until the pose desired is secured, the proper focus being obtained by the scale of measured distances on the outside of the cage.

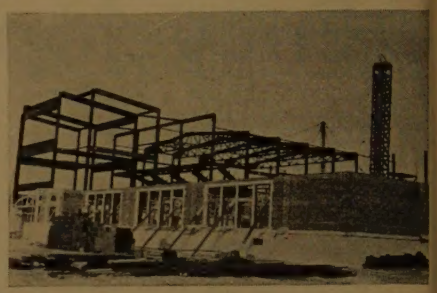
Both the 3¼x4¼ and the 5x7 Graflex have been used and are preferable for some of the more restless animals where great speed is required. Some interesting observations have been made of the various animals while in the cage to be photographed. The pack rat takes his confinement philosophically and makes not the slightest effort to go through the glass sides, very likely his long whiskers inform him of the presence of the glass and he does not need to jump against it frantically, as does the cottontail rabbit, to find out if a barrier is there. The nervous mink runs around the cage a number of times, investigates every crack and corner, then settles down in the place provided for him. The weasel is never quiet even for a tenth of a second. He investigates everything, even the camera lens, time after time and in a more careful manner than the mink. Without doubt, the weasel's movements are much quicker than those of any other animal. Gophers and woodchucks are phlegmatic and show but little signs of fright or nervousness.

Animals to be used as photo subjects should be trapped in live traps and handled quietly to avoid hurting or frightening them. An animal caught in a steel trap has usually been terrified by the experience, as one might expect, and is likely to be maimed by the cruel jaws of the trap.

A few cones and the pine squirrel fits the picture nicely

IN THE MOVIE FIELD

The September issue, its third, is the first number of *Personal Movies* to cross our desk. As its name indicates it is dedicated to the amateur movie photographer. It is published at Sippo Lake, Canton, Ohio; is edited by C. C. Dry and Ruth C. Valentine; sells for one dollar a year and appears to have excellent possibilities. *Movie Makers* still has the edge as an amateur cinema magazine but the newcomer is still very young. While we haven't heard much about it recently, perhaps competition is still the life of trade.



There are bubble marks showing in this picture. Can you see them?

HAVE YOU ANY AIR BUBBLES?

BY F. D. HARTFORD

Sometimes the purchaser of a high grade camera is worried to find one or more small air bubbles in the anastigmat lens. These bubbles, in reality, do not diminish the amount of light passing through the lens, nor do they in any way affect the sharpness of the image.

These air bubbles result from the process of manufacturing high grade optical glass. The several ingredients of such glass must be fused together for just a certain time and then removed from the fire even though all the air in the molten mass may not have been expelled. Thus, instead of being a sign of poor quality, these bubbles, on the contrary, are indicative of very high grade glass being used.

The lens of the camera which made the accompanying photograph contains one bubble more than 1/64 of an inch in diameter and several others of smaller sizes, yet the picture shows extreme sharpness clear across the brickwork.

The only possible lowering of the efficiency of such a lens, in fact of any lens, is the failure to keep the outer surfaces polished and free from dust.

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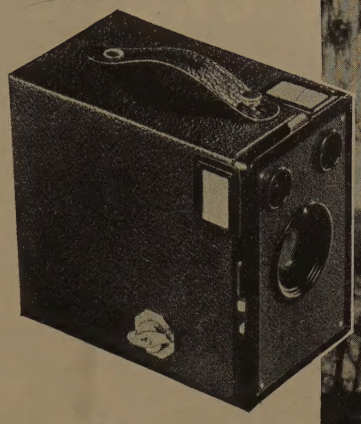

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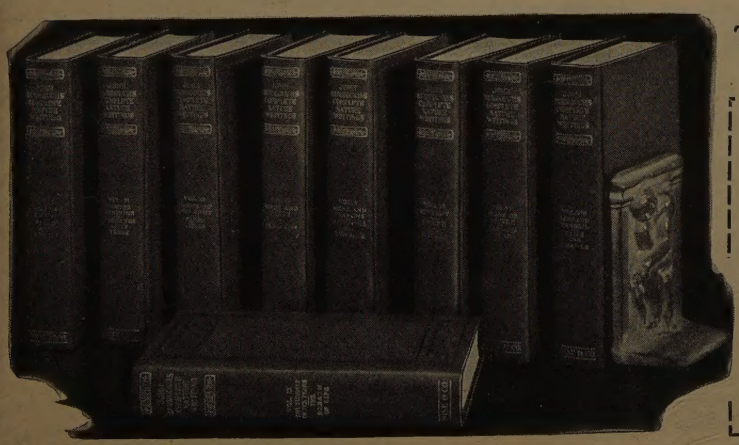
Do bees ever carry stones for ballast on windy days?

What are the best times of day to foretell the next day's weather?



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A Story of a Pool

In *Wagtail* Alice Crew Gall and Fleming H. Crew have written a charming Nature story for youngsters and have told the story of life in a pool, a place where life is both varied and fascinating. The hero who provides his name for a title is, of course, a tadpole who progresses from that immature state to full frogdom and thereafter partakes of the advice of the Patriarch of the Pool, the old frog who is wise with the wisdom of many summers spent at observing the life about him. While we do not like, particularly for the purposes of the pages of NATURE MAGAZINE, stories with human conversation between those living things not vouchsafed the advantage of speech, we will confess that this story probably could not be as well told for the smaller fry were straight descriptive writing used. The great difficulty with putting words in the mouths of whose who cannot use them is that too often these words reflect human experiences that the frog, or the bird, or the rabbit, or whatever it may be, could not have and could not be expected to know about. So long, however, as this manner of treatment is confined strictly to experiences within the scope of the bird, mammal or batrachian, the objection is less valid. In *Wagtail* the authors exhibit a rare ability to keep the conversation logical and believable and their book benefits immensely thereby. The illustrations by Kurt Wiese add much to the little book, which is published by the Oxford University Press at two dollars.

Oneida Lake Birds

It is a work of imposing proportions that Dayton Stoner has done in providing the text for Vol. IV, Numbers 3 and 4 of the Roosevelt Wild Life Annals of the Roosevelt Wild Life Forest Experiment Station. The title of this work, which comprises some five hundred pages, is *Ornithology of the Oneida Lake Region*. The data compiled has reference to the late spring and summer seasons. Mr. Stoner is the field ornithologist of the Station and this publication is outstanding testimony to the fact that he is not only a thorough but an indefatigable observer. His records of his observations in prose form make entertaining reading as well as provide valuable information. The publication is profusely illustrated in black and white and includes two color plates of shore birds done by Sawyer. The volume is available from the Director of the Roosevelt Wild Life Forest Experiment Station at Syracuse, New York, for $1.25.

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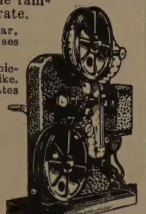
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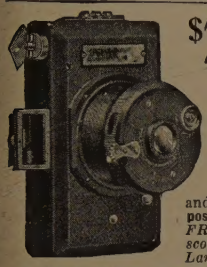
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Huberta

Huberta was a hippo—a quite famous hippo about whom many newspaper stories have been written. Huberta, in fact, made news because she was a wanderer in places where hippos are not supposed to wander and because she was a personality above the common herd. Huberta first saw the light of day in Zululand, and late in 1928 she fared forth from her native pools to become a vagabond. From then until April, 1931, she ambled about, covering in her travels close to a thousand miles. The story of Huberta's meanderings has been told in *Huberta Goes South* by Hedley A. Chilvers, and a delightfully penned and human tale it is. Although her death was untimely and sad, we envy Huberta those thirty months of delicious aimlessness in strange fields and rivers. The author has added to his story of Huberta some interesting chapters on Kruger National Park and other South African areas where wild life is protected for posterity. The book is published by Central News Agency, Ltd., South Africa, and we haven't the least idea what the price is. Anyone interested should write The Commercial Secretary, South African Legation, 11 Broadway, New York City.

New Mexican Mammals

Of inestimable value to the mammalogist and student is *Mammals of New Mexico* by Vernon Bailey, Senior Biologist, Division of Biological Investigations, U. S. Bureau of Biological Survey. It is a book of 412 pages published as No. 53 in the series on North American Fauna issued by the U. S. Department of Agriculture. This present work is one more of the notable contributions made by Mr. Bailey during a lifetime that has brought him to the front rank among the world's naturalists. The volume is for sale by the Superintendent of Documents, Washington, D. C., for one dollar.

About Our Universe

One of the finest series of endowed lectures is the famous Lowell Institute course held annually in Boston. To the platform have come many men noted as leaders in their fields. Frequently the lectures delivered in the course are gathered into book form, and this is the case with *Kosmos,* a book made up of six lectures delivered before the Lowell Institute by W. de Sitter, director of the Observatory and Professor of Astronomy at the University of Leiden. The lectures cover the history of the development of astronomical thought and knowledge and the methods now prevailing in astronomical study. It is a book of outstanding interest to those interested in this fascinating subject and in publishing the book the Harvard University Press has done a real service. The volume sells for $1.75.

Pronghorns Return

Indications that the pronghorn antelope may be returning to the region of the Grand Canyon are contained in the observation of four bands of these mammals seen there recently, according to Donald Edward McHenry, writing in *Grand Canyon Nature Notes* published by the Grand Canyon Natural History Society. The June issue of the Notes also contained an interesting article on Grand Canyon Archaeology by Russell Hastings.

Scene from "Bring 'Em Back Alive"—R. K. O. Van Beuren Picture
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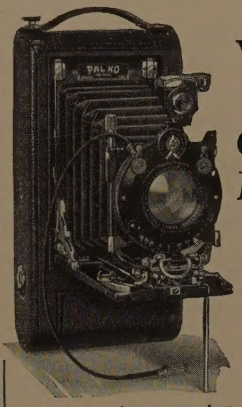
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CONTENTS FOR NOVEMBER · 1932

Sage Grouse ..... R. Bruce Horsfall Cover
Photographic Department 198
A Morning with Sage Grouse
R. Bruce Horsfall 205
Herb Lore of Long Ago ..... Calvin Frazer 209
Cactus Pearls ..... Isabel Hemenway 211
A Fifty-fifty Butterfly ..... Elsie M. Prentice 212
Boa and Rat ..... Stephen Haweis 213
He Ruled the Feeding Stand
Mary Higgins Proffitt 215
Moth Visitors from the Tropics A. B. Champlain 217
The Artful Armadillo ..... Ethel Osborn Hill 218
Topaz for the November-Born
August Pohndorf, Jr. 220
The Wax-Making Insect of China
Herbert Beardsley 221
A Plant Whose Berries Blush Unseen
Fred E. Brooks 222
Faces of Insects ..... Dr. Willy Ramme 223
Friend Badger ..... A. Brazier Howell 227
Charles Dadant, Bee Master
Kent Louis Pellett 229
Writing Rock—A Mystery .. Pearl Heath Frazer 231
Tom and Betsey ..... Ernst Keil 232
Defend the Wilderness ..... Paul A. Schaefer 234
Children's Department ..... Uncle Dick 235
November Skies ..... Isabel M. Lewis 238

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SAVE THE WILDERNESS

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VOTERS IN NEW YORK ASKED TO THROW THEIR ADIRONDACKS AND CATSKILLS OPEN TO EXPLOITATION

We were left alone once on the top of a mountain pass. We sat on a boulder, upheaved in some ancient day, beside a rushing icy stream born of the snow on the mountain at our back. At our feet a cluster of carpet pinks hugged the earth among their mossy foliage. Our only companion of the wind-swept heights was a hoary marmot sunning himself before his rocky den. We were alone in a place that was wild; where that which had life there battled against wind and cold and snow; where Nature ruled with a hand ungloved by anything of man's making. This was wilderness.

We camped once beside a lake that had no name. We hewed our campsite from among towering ferns and pitched our tents beneath primeval forest giants that had grown from seedlings in soil made lush with the richness of forests that had been and died there before them. Fish leaped in the shadows from waters that no lure had ever cleaved. Night brought a silence powerful with the strength of Nature asleep. This was wilderness.

Man has wrought wondrously. He can talk across the seas. He can fly faster than a bird through the air. He can build homes of steel and stone that tower higher than the highest tree. But with all this that man has fathered he has never built anything so perfect as the wilderness.

The record of man's conquest, in fact, is one of conquest of that wilderness. Down through the ages his quest has been to tame the wild and turn it to his purposes. This he has done ruthlessly, exulting in the feat of engineering that built a railroad through a mountain range or a highway over a sky-flung pass. He has hacked and burned away the forest and written commerce across the face of the landscape.

All this man felt that he must do that the civilization he was rearing might achieve the fond goal of a comfortable life. But the day of the pioneer is gone. Little wilderness remains to be tamed. That which still stands untouched does not need to be tamed. Nor should it be, lest man destroy what those who stop to think now know to be an irreplaceable heritage.

The protection against any encroachment upon those few unspoiled areas that yet exist as Nature fashioned them is fundamental. Our national government has given due recognition to that in decreeing certain areas as wilderness inviolable, to be penetrated only by him who has the fortitude and reliance to live with the wilderness and not at its expense.

This vital fundamental is one that will come before the voters of the State of New York on next Election Day. That sovereign state, and its people, declared nearly forty years ago that such areas of the Adirondack and Catskill Parks as still remained primeval should so remain. They wrote this policy into their Constitution, and, since, have valiantly defended it.

Now, through the initiative of two members of their Legislature, there is to be placed on the ballot that will be handed them at the polls on November eighth a proposal that would make naught their four decades of defense. The people of the State will be asked to delegate their authority over the future of their great heritage to the Legislature, a body naturally swayed by partisanship and privilege. They are asked to give up their power to prevent exploitation for the profit of a few and for the dubious benefit of but a few more.

The proposed amendment to the Constitution of the State has been described by Governor Franklin D. Roosevelt as "unnecessary and potentially dangerous". It has the whole-hearted opposition of the Lieutenant-Governor and the Commissioner of Conservation. It is opposed, as well, by all lovers of the outdoors, whether organized or unorganized, and by all who believe sincerely in conservation. But this is not enough. The question is put to the people in a popular vote. To many its significance is obscure. To many others it means nothing. In the brief time that now remains before the day of the election, it is the duty of every Nature lover to see that his neighbor knows what this proposal means that he may vote properly.

Voters in New York, whether they dwell in a Manhattan apartment or in a cabin among the mountains, have a common interest in the glorious land of lakes, mountains and forests that is the Adirondacks and Catskills. Those who wish to preserve them for themselves and for their children will vote "No" in answer to the question on the ballot. The issue is fundamental. It involves a vital question—preservation of wilderness.

SAGE GROUSE STRUTTING

NATURE MAGAZINE

VOLUME 20 NOVEMBER · 1932 NUMBER 5

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A MORNING WITH SAGE GROUSE

AN INTIMATE STORY OF A VANISHING BIRD

BY R. BRUCE HORSFALL

ILLUSTRATED BY THE AUTHOR

IN SOUTHERN Oregon and northern California now lies the dried up skeleton of a one-time beautiful and prosperous lake that occupied a shallow depression on the high semi-arid plateau to the north of Mt. Shasta. Formerly, no fairer home-site for myriads of water and shore birds was to be found anywhere, and delightful days were spent by fortunate naturalists among the wildlings of that protected region—days we would like to live again, but never can.

There cannot be too many big bodies of water in regions of little rainfall—they temper the air and benefit all Nature by supplying needed moisture. Whenever man has built reservoirs for irrigation, plant and animal life has shown immediate response. But drainage frenzy is in the air, and where Nature has built the reservoir, man's first impulse is to drain it—there might be useful land at the bottom. The ultimate gain or loss is not considered.

So it was with Lower Klamath Lake. A great ditch dug at the southern end and a closed flood-gate built at the northern end—in a few short months the sun did the rest. The exposed alkali mud bottom dried and cracked into solid cakes. Fires burned the peaty beds of the old tule and cat-tail islands. Where once nested thousands of water birds, only dusty alkali plains remain. Along the shores where once were prosperous farms and ranches, all is ruin and decay.

With a cover, a frontispiece and this article and its illustrations, this issue of Nature Magazine is dedicated to the sage grouse and to the hope that the extinction seemingly facing this bird may be averted. The unique observations made by William L. Finley and the author may never be experienced again. A short account of them was published in 1920 in the Bulletin of the New York Zoological Society, but we have asked Mr. Horsfall to expand upon this here so that it may reach a wider audience.

It was in the heyday of prosperity for Klamath Lake as a wild-life preserve that we made a reconnaissance of the area. From Klamath Falls we travelled by motor boat the full length of the lake. Forster and black terns were darting about in the light mists of the early morning; ducks, geese and coots hurried to cover with their babies or swam as far away from our boat as the shore line would permit. On the grass-covered flats to the east, beautiful black-necked stilts and avocets were crying their troubles to the grazing cattle that wandered too close to their nests. When alarmed for their treasures, the stilts raised their wings and danced about before the intruders until they turned aside; the avocets lowered their wings to the ground and made belligerent passes at the noses of the cattle, a maneuver that was quite as effective in driving them away. Then the birds went back to their brooding and feeding. The avocets swung their long, recurved bills from side to side through the shallow waters of the ponds, gathering food thus stirred up from the bottom.

With great labor we wormed the boat across the railroad em-

bankment and lowered it into the water by the floodgate at the intake of the lower lake. From the top of the gate we could look down into the clear waters and see trout swarming and milling about, in an abundance that reminded us of fingerlings in a hatching pond.

Our route then lay for some distance through a narrow canal bordered with sedges and tules that towered above our heads, but as the channel widened we began to have distant glimpses of groups of water birds about their nesting sites. The first colony we visited was that of the great blue herons where we had to wade almost to the top of our hip boots as we visited from nest to nest. These tower-like structures, built of dead tules, and rising about two feet above the surface of the water, contained gawky young in all stages of growth.

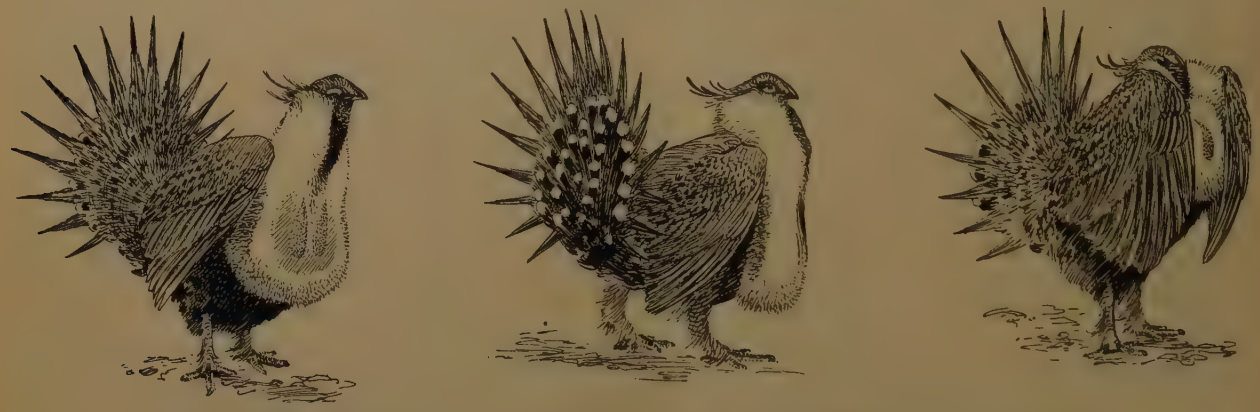
Then a colony of pelicans, looking, in the distance, like a bank of snow under a forest of dark, blue-green tules, attracted our attention. Eggs were lying about on the most flimsy piles of dead, golden-yellow tule stalks scattered among the clumps and groves of growing dark green. Upon our arrival many of the large, ungainly birds rose and joined those already in the air. On land they are most awkward, but in the air they are the acme of grace, sailing about in great circles, now dark against the light, then light against the blue, the black primary feathers emphasizing the brilliance of their white plumage. We were able to locate other colonies by seeing the birds circling above them.

The last bird colony to be visited was one of the western grebe. It can be truly said that the babies of the western grebe are rocked in the cradle of the deep. These nests were scattered about in the sparse tules growing in rather deep water far out from land, but they evidently served the birds well unless some exceptional storm raised waves high enough to wash them from their moorings.

Our destination for the night was Laird's Landing at the foot of the lake, where the proprietor was a successful rancher. He raised his own vegetables and fruit and had a large house, and tremendous barns filled with grain and hay. He always welcomed the game wardens for he had never allowed gunning on his end of the lake. Canada geese on his lowland pasture were as tame as barnyard fowls. Here we had the pleasure of watching the nuptial play of a pair of cinnamon teals well within thirty feet of the bank, close to the house. On the nearby shore was a nest of marsh hawks; on the juniper-clad hills beyond were magpies, mountain bluebirds and many other wild folk. We played about with the young of the great horned owl whose nest was in the woodlot. This family was being carefully protected by Mr. Laird, who had found that they were feeding upon rats, mice, gophers and ground squirrels, the real predators upon his possessions.

"Why, yes, sage hens gather on the flat of the lower pasture every spring, but you are too late this season. Come again next March, April or May and you can take all the pictures you want. There are lots of the birds and they're not a bit scary, 'cause we never shoot them. And, say, they do act funny." This was in reply to a question from Bill Finley as to the possibility of getting some photographs of sage hens.

Mr. Finley had long been looking for a place where sage grouse might be found strutting, and we had chanced upon the very spot. We were in luck, as sage grouse had never been photographed and even their manner of strut was in question.



PROGRESSIVE MANEUVERS IN THE STRUTTING OF THE SAGE GROUSE. FIRST FILLING THE POUCH, THEN THE RUN FOLLOWED BY PUSHING UP THE POUCH WITH THE AID OF THE WINGS

We were unable to accept Mr. Laird's invitation the following year, but two years later found us bound for Laird's Landing once more, equipped with a full moving picture outfit and a good Graflex. The strutting grounds at Laird's Landing were upon a flood plain or alluvial fan dropped by the waters from forest-clad Van Brimmer Mountain far to the south.

Westward lay hillocks and ridges of dark lava rock. Around the base of the hill to the east (shown in silhouette in the frontispiece), winds the emigrant trail where many a covered wagon recoiled from shock of ambush, heard the frightful yell of the Modoc and felt the bite of flint-headed arrows. Scattered about on the hillside above are low-lying, short stone walls cunningly built of the native lava taken from shallow trenches behind. Here the Indians could lie concealed from observation in all directions, yet were close enough to the trail for effective attack. These walls so resemble the rest of the ground as to be invisible from below. They are still as the Indians left them, and while standing among them one may thrill

at thought of the events of those stirring days. As we wandered around looking for sage grouse nests, we picked up numbers of beautiful flints, doubtless dropped in the rush and excitement of the fight.

It was on the morning of May 12, 1917, that we made our first successful photographs of sage grouse in action. We were up at three o'clock, and after a hurried breakfast we stumbled along the deeply rutted road to our blind, set up the previous evening in the midst of the strutting area. No wind was stirring, which was unusual in that high plateau country, and a heavy cloud hung over us as only clouds in an arid region can hang, black as night. The faint yellow light of dawn was brightening the sky as we crept into the blind at four o'clock.

Dark as it was a few birds were already there and by five-fifteen we were able to make the first exposure. About sixty birds came to the field. By seven o'clock, when the sun came up, all had left for the sage brush hills. But we had had birds within fifteen feet of us at times during the period when we watched in great fascination.

chest. There was a quick throw, followed immediately by a more vigorous and snappy toss and the pouch returned to spread out upon the chest as shown in the picture on the cover; rebounding, the bare areas slapped together with a rubbery plop similar to the sound of a popping cork or the snap of one's finger and thumb. This was repeated three times, then the bird eased down for another rumbling gurgle and another stiff-legged run.

It was no doubt this stiff-legged run in the horizontal position that has been reported by some observers and described as a sliding along on the pouch, and this description has been often quoted as accounting for an apparent wear on the chest feathers. This might easily be the natural inference without the advantage of observation over a period of time at close range and of moving pictures for analysis. At no time during the strut did the birds slide about upon their distended pouches.

In regard to the supposed wear of the feathers upon the gular sack or pouch, examination through the seasons disclosed a peculiar development. In front are two

THEN WE HAVE THE EXTREME UPWARD TOSS OF THE POUCH AND NEXT THE SLAP BACK UPON THE EXTENDED CHEST AND FINALLY THE EXTREME SPREAD OF BARE SPOTS JUST BEFORE PLOPPING

Each bird appeared to have a private spot on which no other dared trespass. This was approximately fifty feet from his neighbors in all directions. On reaching these proprietary locations, collisions sometimes occurred and quiet cock-fights took place much after the manner of Chinese pheasants. With rump feathers erect, lowered heads, tails and pouches dragging, the cocks sidled lopsidedly about each other and struck with their wings; all the while scolding in a trumpeting and gurgling grunt as the owner actually pushed the intruder off his domain. A few feet one way or another, the belligerents separated and continued the strut performance.

Some birds began to perform while still well up in the sage brush and kept at it all the way to their chosen areas, others walked quietly to their respective claims before beginning to show off. Here they stood and filled their olive-green pouches with air to the accompaniment of a gurgling sound; then there followed a stiff-legged run in which neither pouch nor wings touched the ground. A sudden stop, and the tail was raised perpendicularly and spread out like an open fan; simultaneously the head was thrown back and, with the aid of the wings the air-filled pouch was pushed well up upon the puffed-out olive-green, bare spots resembling a toy balloon, colorful when distended and darker when wrinkled and at rest. These spots are surrounded by specialized short stiff feathers, shortest and stiffest immediately bordering the bare areas. In the fall, when new, the vanes of these feathers are exceedingly friable. Some feathers have a tendency to break up even before they have entirely emerged from the quill, and, by the time the birds are ready for their spring display all have broken away to almost no feather at all. The resulting stiff bristles do not interfere with the vigor of the snapping movement as soft feathers would do but leave the bare areas free to come together in the rebound for the rubbery plop.

Whatever the explanation, it was quite evident that, while these queer antics are affairs of the nuptial season, they have no reference to the winning of the females. Nesting was already under way and when, in the course of the morning or evening, a few hens wandered through the throng on their way to water, the cock birds took no notice of them.

Examination of sage grouse droppings revealed the fact that many insects were eaten. We found hard shelled beetle remains, some sand wasps or hornets, grasshoppers,

and other undetermined varieties. There were also quantities of leaves, buds, flower-heads and seed capsules. An important need seems to be daily meals of alkali mud or a drink of alkali water as an aid in the discard of sage leaves, which appear to pass unchanged through the digestive tract, except for the loss of chlorophyll. They have no muscular, grinding machinery known as a gizzard. To obtain the needed alkali, the birds gather around water holes at daybreak and are gone again into the hills with the rising of the sun. We watched them fly at least two miles, and probably farther, to and from their daytime haunts. The flight was steady and strong and rather quiet. One cannot hear them go as one can other grouse.

HERE WE HAVE A NEW FEATHER FROM NEAR THE BARE SPOTS IN SEPTEMBER, AND THEN A FEATHER FROM THE SAME LOCALITY IN MARCH, AND, FINALLY, A WORN FEATHER FROM WHERE THE WINGS IMPINGE UPON THE POUCH IN MARCH

It is a curious fact that so few observations had previously been made and so little had been written about such a large, conspicuous and, withal, such a tame wild bird as the sage grouse. I remember that while I was walking across a flat plateau near Warner Mountain, a bunch of sage hens along the side of the road paid no attention whatever to me. They could easily have been knocked over with a club. Since that time an automobile road has been built through there and the grouse—well—there are no grouse left along that particular trail.

These wonderful birds are on the verge of extinction. They are going and going fast. As lakes are dried they die of thirst; when roads are built through their habitat they cannot survive the guns. Some assure us that magpies are to blame for their disappearance, and would have these birds exterminated, wholly forgetting the fact that magpies and grouse have lived in harmony for thousands of years. Both birds were plentiful when the white man appeared. But why not give the magpies fair consideration? While the magpie may take a grouse egg once in a while, his regular food is small rodents and grasshoppers and various other insects of enormous potential damage, so the magpie has a real place in the economy of Nature.

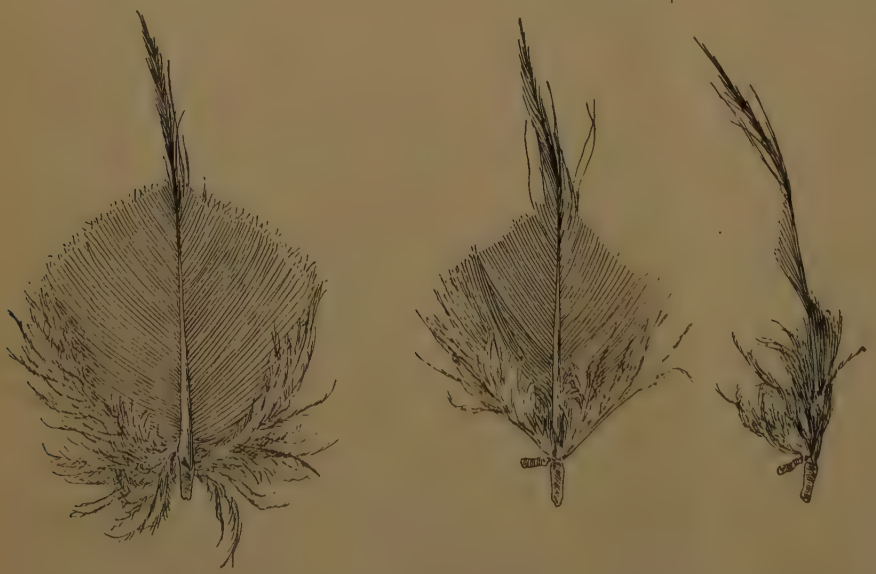
I never did believe in the necessity for the slaughter of the magpie, though, by all means, let us protect the sage grouse in every possible way. However, the fact remains that no wild species can be saved by killing something else. Perpetuation of our wild life lies not in the vicious cycle of destruction.

One of the chief factors contributing to the extinction of our sage grouse in this region has been the despoliation of Lower Klamath. This lake with the surrounding lands has been drained despite the fact that it was set aside by President Roosevelt as a permanent water-bird preserve.

Although the project has failed from the standpoint of utility in recovered land, the chances are nil that anyone will have the interest or courage to dam the drainage ditch and chop open the floodgate. For years to come this great area will remain a desert, another permanent example of marvelous blundering. At great expense we have despoiled ourselves of a wonderful heritage.

Where once was abundant life all is desolation. Gone are the lordly grouse from their former haunts. Gone is the prosperous farm and all that it stood for in that lonely country. Gone are the pastures and their herds. Dried are the lands and the wells.

The water can be returned and, after many years, islands of nesting birds; but sage hen, unique, the largest of our grouse, is gone from there forever.



THE FIRST FEATHER, TAKEN IN SEPTEMBER, COMES FROM BELOW THE POUCH. THE NEXT SHOWS THE BREAKING OFF OF THE TIPS BEFORE COMPLETE EMERGENCE FROM THE SHEATH. THE LAST, THE SAME FEATHER, SIDE VIEW, SHOWING DOWN EMERGED FROM SHEATH ON THE UNDER SIDE OF THE FEATHER

TITLE-PAGE FROM THE FIRST EDITION OF THE "GRETE HERBALL" (1526)
The man is gathering grapes; the woman pouring herbs from her apron into the basket. The figures at the lower corners represent mandrakes

HERB LORE OF LONG AGO

BY CALVIN FRAZER

BEFORE the days of botany, no country gentleman's library was complete without a herbal. As a means of identifying the common plants the herbal was a very tolerable substitute for the modern flora. Many of these books were admirably illustrated; the accurate drawings making up for what was vague and fantastic in the accompanying text.

A knowledge of herbs was then, as now, especially a feminine accomplishment, but our many-times-great-grandmothers looked upon these productions of Nature mainly from the utilitarian rather than the esthetic point of view. Apparently our ancestors of three or four centuries ago had but little appreciation of the grace and beauty of the vegetable world. The country housewife cultivated scores of flowering plants in her garden, and felt a lively interest in innumerable others growing at large in field and forest, but her interest in them was almost entirely practical. It was a part of good housekeeping in those days to know the reputed medicinal virtues of herbs and to apply this knowledge in the culling of "simples" and the preparation of household remedies that purported to have values often miraculous.

Gentlewomen were especially adept in this art, and their still-rooms served as dispensaries for the whole countryside. The lady of the manor, making her charitable rounds among the ailing peasantry, would administer various cordial waters of her own compounding, which generally had the great merit of being harmless, and, thanks to the lively faith of the patients, often worked marvelous cures. One is rather tempted to envy the complacent credulity of people who saw in the familiar plants about them Nature's own remedies for nearly all the ills of humanity, including some for which the modern practitioner would hardly venture to prescribe.

Most of the old herb lore has passed into oblivion, but it has left its mark very widely upon the nomenclature of the vegetable kingdom. For example, *Solidago,* the technical name of the goldenrod, recalls the fact that this plant was once esteemed a sovereign vulnerary —efficacious in uniting or consolidating the wounded tissues. Old Gerard, the greatest herbalist of his time, tells us that goldenrod "is extolled above all other herbs for the stopping of blood in sanguinolent ulcers and bleeding wounds." Eyebright is so called because it was once

esteemed a remedy for defective sight, enabling old people to read without spectacles, and even—the herbals tell us—sometimes restoring sight to the blind. Saxifrage and sassafras both derive their names from Latin words meaning "stone-breaking," in reference to the use of this plant as a remedy for gall-stones or bladder-stones.

The Canterbury bell was a specific for swellings of the throat and was sometimes called throatwort. From the lily of the valley was distilled a "golden water," supposed to give strength to the limbs. Valerian juice was alleged to draw iron or wood out of the flesh. The knitting of broken bones might be hastened by taking the roots of Solomon's seal in ale. Water of fumitory cooled the liver. To cure toothache we are advised to "dig up groundsel

SCORPION-LIKE PLANTS FOR SCORPION BITES
This according to the doctrine of signatures. From an herbal published in 1591

with a tool that has no iron in it; touch the tooth five times, spitting thrice after each touch, and replace the plant." Rue was said to quicken the imagination and reasoning powers; sage to improve the memory. Periwinkle leaves, administered to one's husband or lover, would recall his errant devotion.

The medicinal plants in which our forefathers put their faith were called "simples," because each was supposed to be Nature's remedy for a particular ailment. According to the curious doctrine of "signatures," the part of the body for which any plant was beneficial or the disease that it was especially adapted to cure was indicated by the plant's form or color, or by some mark upon it. Thus liverwort (Hepatica), having a three-lobed leaf somewhat in the shape of a liver, and furthermore being mottled with purple when old, was used for liver

A 15TH-CENTURY DRAWING OF THE MANDRAKE
Pulling it up was supposed to be fatal; hence dogs were employed for this task

troubles; the yellow bark of barberries was taken for jaundice; the herb-robert, whose leaves assume a beautiful red hue when dying, was applied to staunch wounds; and the bloodroot, on account of its red juice, was thought to be good for diseases of the blood.

This famous doctrine, which held sway among medical practitioners for centuries, is set forth as follows in a work by William Cole, published in 1656:

"Though Sin and Sathan have plunged mankinde into an Ocean of Infirmities, yet the mercy of God which is over all His Workes maketh Grasse to grow upon the Mountaines and Herbs for the use of Men, and hath not only stemped upon them (as upon every man) a distinct forme, but also given them particular signatures, whereby a Man may read even in Legible Characters the Use of them. Heart Trefoyle is so called not only because the Leafe is Triangular like the Heart of a Man, but also because each Leafe contains the perfect Icon of an Heart and that in its proper colour, viz., a flesh colour. Hounds tongue hath a forme not much different from its name which will tye the Tongues of Hounds so that they shall not barke at you, if it be laid under the bottoms of one's feet. Walnuts bear the whole Signature of the Head, the outwardmost green barke answerable to the thick skin, whereunto the head is covered, and a salt made of it is singularly good for wounds in that part, as the Kernell is good for the braines, which it resembles."

And one does not have to go without the borders of the United States today to find localities where the old-fashioned remedies of an age of superstition still have vogue.

CACTUS PEARLS

BY ISABEL HEMENWAY

A COLLECTION OF CACTUS "PEARLS"

Some fantastic shapes are taken by these interesting growths in the cactus. They may fairly be described as pearls

THOUGH pearls from cactuses may seem as far-fetched as the proverbial figs from thistles, the collector of these desert curiosities is reasonably justified in his nomenclature. Let him have no hope, however, of any commercial profit!

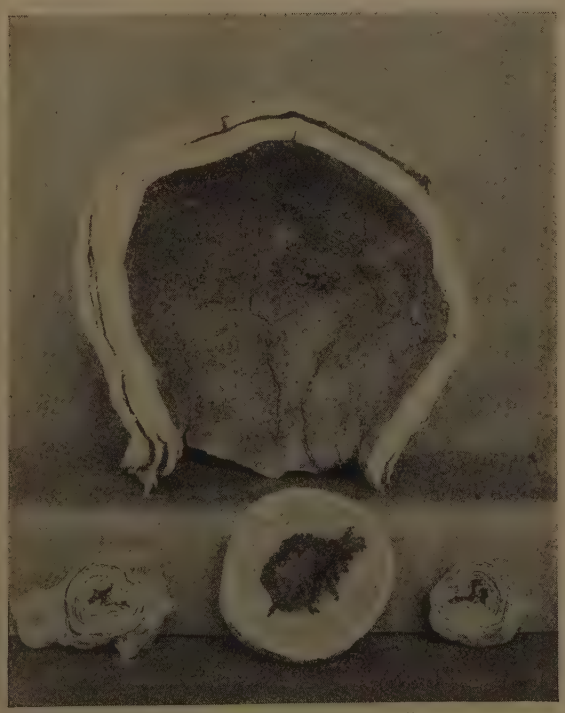
For cactus pearl hunting, he needs no diver's suit, but only stout boots and, preferably, a skin immune to sunburn. Let him tramp in search of a fallen giant cactus or sahuaro, and when it is found, poke among its dried remains. He is almost sure to come across strange, hard, round or elongated, knobby objects, ranging in size from that of a pinhead to possibly two feet in length. The larger ones, hollow, and with a gray and more or less bark-like surface, he will hail as "woodpeckers' nests" and perhaps haul home to use as hanging baskets for delicate desert vines. The small ones, toned from ivory to light brown, some round, some fantastic or baroque in shape, and many with a slight iridescent gleam on their polished surface, may find their way to mantel or cabinet, labeled "cactus pearls."

Like the oyster pearl, the cactus growth is caused by the response of a living organism to an irritating stimulus. In both cases the pearl is formed in concentric layers and displays an iridescence due to slight irregularities on the smooth surface. But there, it must be confessed, the resemblance ceases.

In the bivalve, the mantle secretes a nacreous solution that surrounds the foreign body and protects the tender living tissues. The cactus, on the other hand, builds up successive layers of cells of traumatic or wound tissue, chiefly woody or lignified in character, with which to wall off the incisions made by birds, insects, and other destructive forces.

Cactus pearls, though found most commonly in the sahuaro, also occur in the structure of other species, chiefly the round *Opuntia,* such as the cholla, and the *Echinocactus,* or barrel cactus. Sometimes bizarre shapes resembling branching coral, or distorted figures of miniature animals, are picked up by the tourist to "puzzle the folks back East."

In dissection, varying types of structure are found. Some of the smaller, most regular pearls are almost solid, and surprisingly heavy. These invariably have a spongy black substance of unpleasant odor in their center, and were probably caused by insect attacks. In cases where no apparent exit was made, we might guess that they acted as living tombs for the intruding enemy.



CROSS-SECTION OF CACTUS "PEARLS"

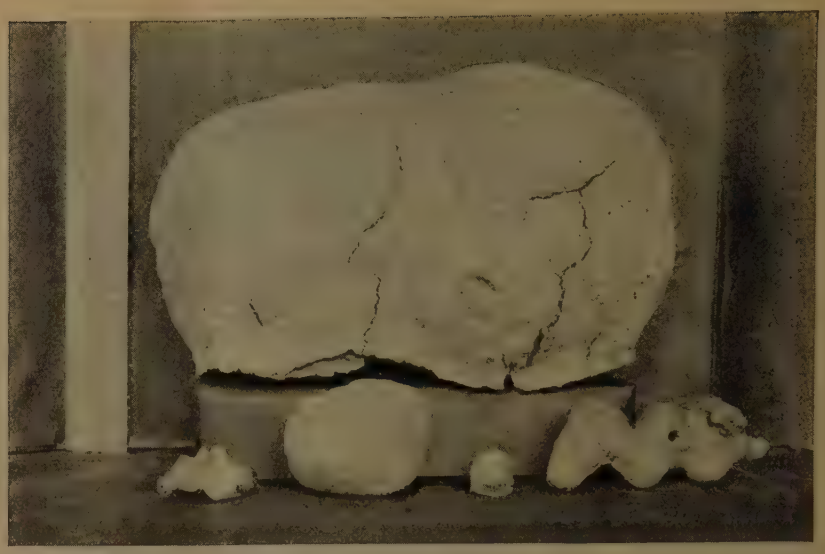
This shows the manner in which they are built up of layer upon layer

Others are comparatively thin-walled and hollow. To this class belongs the "woodpecker's nest", so-called. Actually, of course, the materials contributed by the bird have long since fallen away, and there remains only the hardened shell of protective tissue built by the cactus around the walls of the excavation.

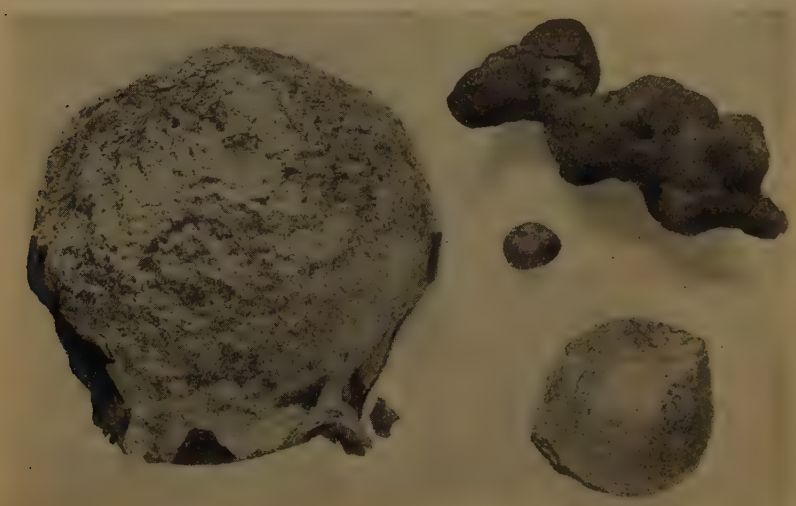
It is surprising to note the toughness and weather-resisting properties of these growths, especially those of the sahuaro. Even after the skeletal structure of the cactus has almost disintegrated, pearls have been found retaining their original shape and pristine smoothness. This is due to the fact that the cells which go to make up the pearl tissue are ac-

tually thicker- and harder-walled even than those of the woody skeleton of the plant. In other words, Nature is nothing if not thorough, and in setting out to reinforce a weak place in her battlements, as always, has exceeded the strength of the original structure.

Within the prickly green walls of cactus still living, there must be millions of cactus pearls in the making. Practically every large sahuaro has at least one woodpecker's nest, while many have been almost riddled and their potential life span of several centuries considerably shortened by the architectural fancies of the gilded flicker, *Colaptes chrysoides mearnsi* whose range is practically restricted to that of the sahuaro, and that other active excavator, the gila woodpecker, technically called *Centurus uropygialis*.



A "PEARL" OF REAL SIZE AND PROPORTION
Showing one of the larger growths compared with smaller ones more usually found in the cactus. Below are more "pearls"



Once deserted by its original builder, one of these palaces of pearl may be successively the abode of widely differing tenants. Woodpeckers, however active in making new holes, do not disdain to occupy nests built by their brethren, or to use them as pantries. The recesses of a sahuaro recently cut down were found to be full of bread crumbs taken from the feeding platform and stored against a desert "rainy day".

While other birds may live there occasionally, three in particular are well-established tenants: the elf owl, desert sparrow hawk, and western martin.

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A FIFTY-FIFTY BUTTERFLY

BY ELSIE M. PRENTICE

IT TAKES the bright, sharp eyes of the youngster to see things that we adults miss, and it was a member of the observing younger set who brought me the live butterfly pictured here. "Do you have one like this?" he wanted to know.

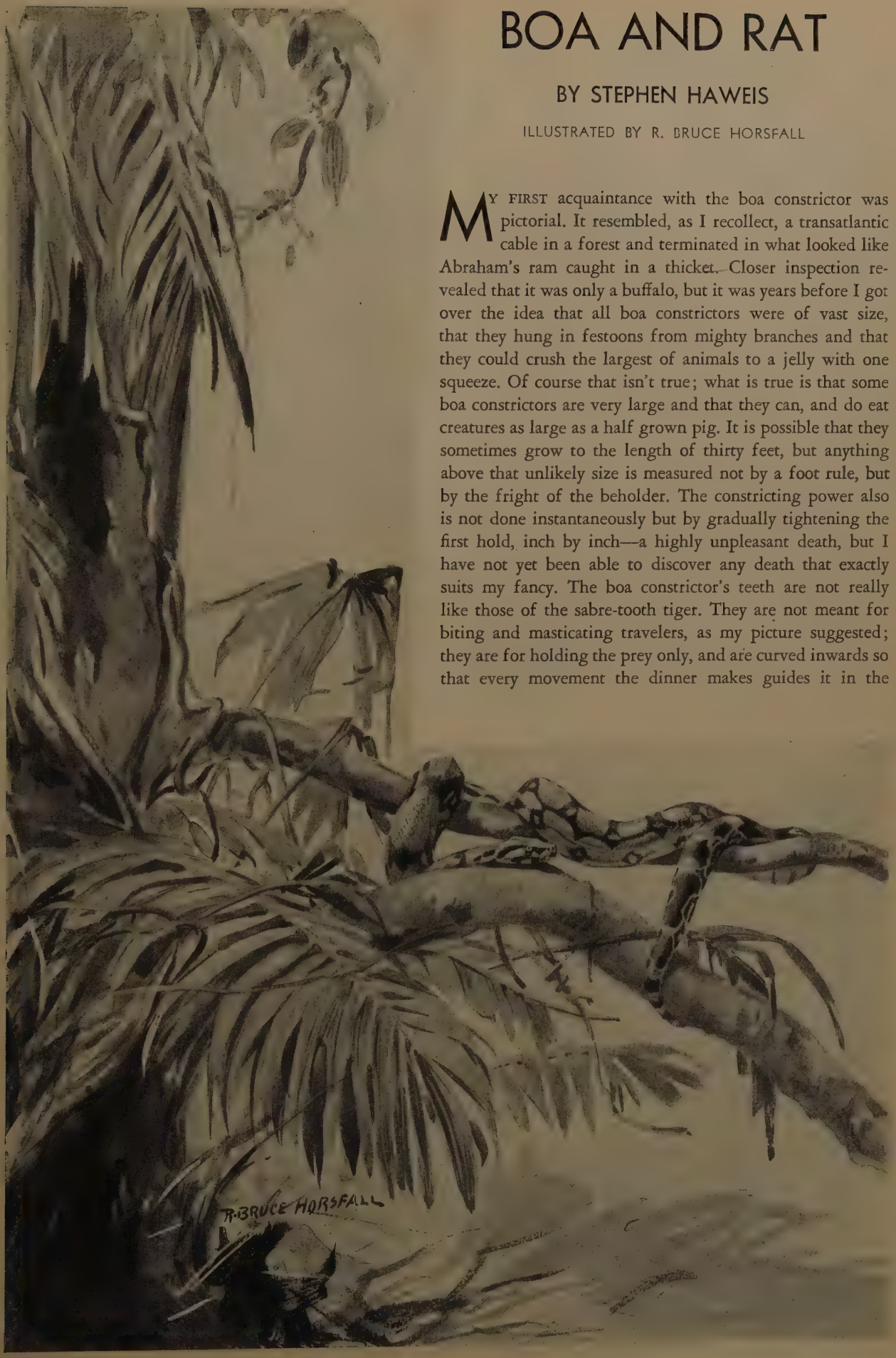
Most people are familiar with the large black and yellow tiger swallowtail first seen flying about when the apple trees are in bloom. Few, however, seem aware of the fact that he has mates of two distinct colors, one of these yellow and black like himself but with blue on the hind wings, and the other an entirely black insect with blue on the hind wings. The first is known as *Papilio glaucus* form *turnus*, and the other as *P. glaucus* form *glaucus*.

But there is a rarer form that makes a fifty-fifty combination and is interesting therefor. Its left wing, as pictured here, is like the *glaucus* form with several added yellow spots on the upper part of the lower wing, while the right wing is adorned with the yellow and black as in *P. turnus*.

BOA AND RAT

BY STEPHEN HAWEIS

ILLUSTRATED BY R. BRUCE HORSFALL



My first acquaintance with the boa constrictor was pictorial. It resembled, as I recollect, a transatlantic cable in a forest and terminated in what looked like Abraham's ram caught in a thicket. Closer inspection revealed that it was only a buffalo, but it was years before I got over the idea that all boa constrictors were of vast size, that they hung in festoons from mighty branches and that they could crush the largest of animals to a jelly with one squeeze. Of course that isn't true; what is true is that some boa constrictors are very large and that they can, and do eat creatures as large as a half grown pig. It is possible that they sometimes grow to the length of thirty feet, but anything above that unlikely size is measured not by a foot rule, but by the fright of the beholder. The constricting power also is not done instantaneously but by gradually tightening the first hold, inch by inch—a highly unpleasant death, but I have not yet been able to discover any death that exactly suits my fancy. The boa constrictor's teeth are not really like those of the sabre-tooth tiger. They are not meant for biting and masticating travelers, as my picture suggested; they are for holding the prey only, and are curved inwards so that every movement the dinner makes guides it in the

"THE GROUND BY THE SIDE DOOR WAS SOFT ENOUGH TO DIG. AND THE RAT DUG. UNDER THE DOOR IT MADE A SIZABLE HOLE WHICH OPENED PRESENTLY UPON . . . FREEDOM"

direction where the snake thinks it will do the most good.

I have caught and kept many of the harmless snakes as pets, and all those that do not kill their prey with poison fangs are more or less constrictors. I had therefore lost most of my fear of harmless snakes before I encountered my first wild boa constrictor. It was entwined in a thicket just above a hole in which it lived, sunning itself after several hours of rain, which is always the most opportune time to look for them. As I approached it started slowly for home on general principles, because it was not frightened at all. It was impossible for me to seize it as one should by the back of the neck, so I took hold of the tail gently, arguing that if I could not reach its head, neither could its head reach me. The snake did not seem to know that it had been caught and thought, I suppose, that its tail was hooked into a cleft or forked branch. It must be quite hard for a snake always to know what is happening to its rear cars. Its head moved to and fro, seeking the best route homewards and trusting to luck that its tail would get free gradually. Then the head came nearer and I was able to get a proper hold on its neck just behind it and drew it out easily. Even then there was no struggle, no lashing about; it merely coiled slowly round my arm and I carried it home, relieving the strain of its constriction occasionally by unwrapping a fold or two. While its loops are large and loose a constrictor is practically helpless.

In Dominica the boa constrictor is called a *tête-chien,* or dog's head, in the local patois. The people are afraid of them, because of course they do bite when cornered and their saw-like teeth make a ragged scratchy wound. This snake was about seven feet long. It was perfectly docile until it was put in a box, but a box seems to make a snake feel that there is safety only in attack, since it cannot slither away to safety in retreat, but what surprised me was that it was such a poor shot. It missed me repeatedly, and I have seen snakes of the same species miss a rat or a chicken over and over again. How they catch a wild animal I cannot imagine; it is fortunate they are abstemious and can go without food for long periods. That snake went to the Zoo, but I had another not long since that was a foot longer—a much larger snake in every way, for every foot over six makes a great difference to a snake's waist measurement. I offered it a chicken, but though I saw it strike at it many times it did not eat the bird. The chicken lived with the snake for more than four weeks without showing any particular fear of it except when struck at, when it registered considerable disapproval and changed its perch. Somebody had to eat the chicken, so I ate it myself at last. Then I gave the

snake a large frog, hoping to preserve the reptile from starvation.

"Frog does kill snake," said Cecilia, "they does sit in a hole and when snake come he catch it by the head, so he can't go."

But of course I knew better than that and proceeded to show what the snake would do. It did nothing, and never did eat the frog, either, although it ate several rats before it was released from bondage by one which was more intelligent than the others.

It is about that rat I wish to tell. I caught it at last, after many abortive attempts, and when finally it was in the trap I observed that it was blind of one eye and had lost nearly half its tail. I gave it to the boa constrictor which struck at once, and missed as usual. But the rat was no half-witted chicken. It knew all about boa constrictors and how bad they are for rats to associate with. It did some quick thinking, and made a plan which it executed with speed and dispatch. It did not make the mistake of sitting down in a corner for a wash and brush-up; it got busy at once and kept moving. I did not watch it for very long but what happened was perfectly obvious the next morning. The rat searched the stone walls for a hole and knew there was no escape possible through the wire at the top of the cage. There was only one chance, which neither I nor the frog, nor any of the other rats had noticed. The ground by the side door was soft enough to dig. And the rat dug. Under the door it made a sizeable hole which opened presently upon . . . freedom. The snake also found the hole and, with the Houdini genius for squeezing into small crevices and exuding entire on the other side, it followed the rat. I have not seen it since.

Yes, the rat is a clever creature, but like many other clever people it makes a silly mistake once in a while. That one did, though I will not flatter myself that it was I who "got upon its blind side." Two days later it was back in the very trap in which it had been caught before —and that is not very intelligent. When I saw it again, I could not help feeling that its first exploit ought to have earned my respect and that I ought to release it. It did not deserve to die. Had it not earned its liberty? In common justice. . . . But I also thought of the damage it had done in my house, the noise, the smell and the mess as well as its general rattiness . . . and after all, for rats or men, there's very little justice in the world, is there?

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HE RULED THE FEEDING STAND

BY MARY HIGGINS PROFFITT

When, several years ago, I put out from the window ledge of my Maryland home my feeding stand, consisting of a board with boxes for crumbs, and moored one end of it to a cherry tree, I discovered that a mocking-bird ruled that particular corner of birdland. No titmouse or jay dared eat unless it pleased him, and whether the feeders were cardinals, juncos, or myrtle warblers, he made them regulate their mealtimes by his whimsies.

He bullied the titmouse particularly. One day the dainty bird had just alighted on the stand and was pecking gently at the suet when the mocker came sailing down with wing and tail feathers outspread, to bob and teeter on a nearby branch so stormily that the tit fled in dismay. Later the same afternoon, when the victim had returned for his supper, which he took in nervous bites between frightened looks over his shoulder, the sharp threatening note of the mocker was again heard from the plum tree in the yard, and he again drove the timid bird away by a threatening rush. Then, after he had feasted, he settled down beside the food, closed his eyes, and seemingly went to sleep—a veritable dog in the manger! And though he napped for an hour before he again resumed his meal, no other bird had dared to approach.

LORD OF THE FEEDING STATION
The bully mocking-bird playing dog in the manger with the suet

Perhaps he claimed priority because he had been the earliest patron of my stand during the early winter. I had originally put out some suet for the titmouse, but he had sampled it first. He seemed to have no sense of fear, and would eat with humans within three feet of him. As the season advanced, he came to depend more and more on my provisions, and it was not until spring had come and the forsythia was blooming that he forsook his home in the cedar tree. He still stayed in the neighborhood, however, for I could hear him practicing his love songs both night and day, and it was not until the nesting season had passed that he sought his period of rest in the larger trees and thickly wooded places remote from the house. By that time, however, the other birds had found other feeding places, and no longer could profit by the absence of the bully of the cafeteria.

DRIVEN BY SOME URGE ABOUT WHICH WE KNOW NOTHING, MILLIONS OF THE COTTON MOTHS MIGRATE NORTHWARD EVERY FALL— THERE TO MEET THEIR END

MOTH VISITORS FROM THE TROPICS

BY A. B. CHAMPLAIN

ILLUSTRATED BY R. BRUCE HORSFALL

MILLIONS of little cotton moths visit our northern cities every year. About the middle of September and in October these migrating insects draw considerable attention—not because of any outstanding physical appearance or character—but because of the density of the swarms that often swoop down into metropolitan centers. They may be attracted by the alluring bright lights that cast an inviting glow into the upper atmosphere. Before the question is asked, we may as well state that the reason for this moth's exodus from the South is somewhat of a mystery. Why many of them become possessed of "wanderlust" and make the trip to the colder regions, there to end their days, instead of remaining in the South, is an open question. The officers of the moth organization cannot tell us the reason and little can be learned of their itinerary.

FLUTTERING ABOUT THE ARC LIGHTS IN SWARMS, AND LIGHTING ON ANY HANDY OBJECT

Having persuaded a few of them to pose for their portraits we note that they have a wing expanse of about one and one-third inches. They are olive gray or pale brown in color, with a delicate purplish lustre that is very becoming. In the center of each forewing there is a small spot that looks well and gives them individuality.

At night they start their tour of investigation of our cities and may be observed fluttering about the arc-lights in great swarms or attracted to the lighted store windows. They congregate on poles or on the sides of buildings adjacent to lights, or come to rest on any handy object that happens to be in their path.

During their travels they sometimes damage ripening fruit and vegetables, for they are able to break the skins of peaches, grapes and other sweet morsels in good taste, and suck the juices. But, altogether, they do little harm.

Way down South the larvae or caterpillars of these moths are known as "cotton leaf-worms." They are more or less destructive every year in the cotton belt, where they feed entirely on cotton, both cultivated and wild, eating the foliage, and also attacking the blossoms and squares. These caterpillars are easily kept under control by arsenical sprays. Natives of the tropics, cotton moths enter the United States from Central and South America each year. But these migratory hosts all finally succumb to the cold weather when winter sets in.

Occasionally at the lights, fraternizing with our little tropical visitors and the host of other bugs, moths and flies drawn by the alluring glares, may be found a giant moth of sombre hue. This strange and beautiful dusky creature fluttering about is often, on account of its large size, mistaken for a bat. It is the "Black Witch," one of the largest of our American moths, and has a wing expanse of five inches or more. The remarkable feature that distinguishes the "Black Witch" from other moths is its powerful and extended flight. Candidly stating that we do not know their object in leaving home, nevertheless numbers of them are conveyed by flight, wind and air currents, across land and sea to distant shores. Although breeding only in tropical climes, these moths have been recorded from Brazil to Canada, and collections show that specimens have been taken in Maine, Connecticut, Wisconsin, Colorado, California and numerous other states. Many of them arrive in the North in a battered condition, worn and dilapidated; others make the long aerial voyage unharmed. But, like the cotton moth, they never live to return home.

THE ARMADILLO IS OFTEN KNOWN AS "THE POOR MAN'S PIG"
It has served frequently as food in times of stress, flood or drought but it also serves the farmer in his war against insects

THE ARTFUL ARMADILLO

BY ETHEL OSBORN HILL

After living long in modest retirement, that queer, interesting little animal, the nine-banded armadillo of Texas, is gradually being forced into the spotlight of public attention while the question "Is he friend or foe to mankind?" is argued pro and con.

Probably the general public knows less of the armadillo than of any other mammal that occurs in such numbers and covers such a wide range in the southwest. Although the armadillo's natural habitat is the hot, hilly regions of Mexico, Central and South America, and southwestern Texas, in recent years there has been a marked increase in its numbers and a considerable extension of its territory range in our southwestern states. It is now as numerous in central and east Texas, even down in the Gulf Coast counties, as formerly it was in the rocky country surrounding San Antonio and along the Mexican border, and it has extended its range into New Mexico and the western border of Louisiana. This, in spite of the fact that it is persistently hunted by curio manufacturers, is ruthlessly slaughtered by hunters, and has never been protected by game laws.

It is not generally known that the flesh is esteemed a great delicacy by those who have eaten it, or that the armadillo has become of such economic importance locally in times of food shortages following drought and floods, in east Texas particularly, that it is often called "the poor man's pig" or "poverty pig". The meat is white and tender, of the flavor of young pork. As the diet of the armadillo consists mainly of insects, and possibly some tender vegetation, and it is most cleanly in habits, there can be nothing offensive about its flesh.

The Texas armadillo is a variety of the wide-ranging species or group having nine sections in the horny plate that covers the body. Other varieties in South America have only six bands. When caught, the armadillo will promptly draw in its head and feet, turtle-wise, and then roll quickly into a ball. Left alone it will begin to dig a tunnel, which it does with unbelievable rapidity.

Armadillos, at maturity, usually weigh about twelve pounds, but some attain a much larger size. If brought to bay, they have no defense but their powerful claws. However, they are gentle and easily tamed, and make interesting and unusual pets. They should never be confined in a cage.

The young are born in early spring, in litters of four, always all of one sex. Armadillos live in burrows, which they dig, from four to six feet underground. They sleep much of the time in cold weather, but as spring advances and insect life becomes active they spend a great part of both day and night foraging. They are socially in-

clined, and are found in droves, sometimes as many as fifty being seen together, snuffling about old logs or in newly plowed fields.

When startled, an armadillo will rise quickly on its hind feet, look timidly about and then run for shelter. They do not usually roam far from their own burrows. Neither do the parents allow the young ones to come out of the tunnel until able to feed themselves, or, presumably, until they are weaned. The mother armadillo nurses her babies for about eight weeks, after which they forage for themselves, the parents taking a great interest in the family, guarding them when outside and hustling them into the burrow at the least hint of danger.

A BASKET OF ARMADILLO SHELL

Commercialization of these interesting, harmless and useful little animals has cost the lives of thousands of them, just for curios

The shell, or horny covering, is naked and of a soft, mottled gray color, the under-body bearing a few long, coarse hairs. The snout is long and slender and the mouth is very small, with a few peg-like teeth. The animals are near-sighted, but keen of hearing and swift runners.

Arrayed in defense of the armadillo are many farmers who have taken the trouble to observe the habits of the animal. Typical of this class is A. T. Davis, who declares that the armadillo is a very valuable animal because it catches cane beetles infesting his fields. He emphasizes the importance of a law to protect them.

Dan Foster, field assistant of the U. S. Biological Survey in Texas, states that many farmers are not willing for him to begin a rodent extermination campaign in their community until he assures them that he will not molest the armadillos.

G. J. Harrison expresses the view of other farmers nearby in Hardin County near the Big Thicket, when he declares that cane borers and black beetles had practically ruined his cane crops for several seasons until the armadillos came into the community. Mr. Harrison states that he has watched the little animals at work, going systematically and industriously down the cane and corn rows, positively "cleaning up" on the insects. Even those farmers who state that armadillos harm the early gardens and sometimes uproot a few stalks of cane express the belief that it is done in the search for worms and insects and that the good far outweighs the harm they may do.

On the other hand, hunters and sportsmen declare that armadillos should be exterminated because they destroy great numbers of the eggs and young of ground-nesting birds, such as quail, partridge, wild turkey and woodcock. However, it is a well-known fact that most of the wild feathered game was practically exterminated by man himself in regions of Texas where the humble little armadillo had never set foot.

Although no hunter has yet come forth to make affidavit that he has stood by and watched an armadillo eat a nestful of wildfowl eggs, there is a common belief that the astute creatures do occasionally regale themselves with such a feast—but no less an authority than the late Prof. H. P. Attwater states it as his belief that armadillos do not deliberately search for eggs, but "if they come across a nestful of nice warm eggs, they might make a meal of them, just as you and I would if we were hungry!"

The examination of the stomachs of many armadillos, both in the field and the laboratory, has disclosed a great variety of worms, adult and larval beetles, ants, grasshoppers, crickets, bugs, centipedes, myriapods and other invertebrates. No trace of larger creatures or of the eggs of birds, or of vegetable matter, has been found. Vernon Bailey, of the Biological Survey, in his report on the mammals of New Mexico (North American Fauna No. 53), mentions one stomach that contained forty-three caterpillars, mostly cutworms, thirty-six beetles of eleven species, eleven grasshoppers of five species, many ants, and fly larvae, spiders and myriapods. Another, among varied items, had eaten one hundred and twenty caterpillars, mainly cutworms. He concludes:

"The wide range of insect food of armadillos seems to include most species with which they come in contact and to consist in greatest bulk of those most numerous and easily obtained. There is no evidence to substantiate the accusations that armadillos destroy garden vegetables or eat the eggs of poultry or game birds; moreover, the small and toothless opening of their mouths would render it difficult, if not impossible, for them to break or eat any but very small eggs or in any way to injure birds or young poultry. Although their food habits require further study, it now seems safe to conclude that armadillos are harmless and in a high degree beneficial mammals, and their extension of range should be welcomed rather than discouraged. The sale of their shells for baskets and curios should be severely condemned, as it threatens the extermination of these extremely interesting and useful little animals."

Thus it seems the unobtrusive little armadillo has even started trouble between capital and labor, so to speak. The farmer demands a protective law; the hunter and sportsman as determinedly asks for execution; and the naturalist demands proof of guilt before sentence is passed on the queer little animals called, variously, anteaters, grave diggers, farmer's friend, sportsman's pest, and poor man's pig.

TOPAZ FOR THE NOVEMBER-BORN

BY AUGUST POHNDORF, JR.

The next to the last article by the well-known lapidary on the stones that represent the twelve months of the year.

GEMS FROM QUARTZ TOPAZ
This is not the true topaz but is often used for gems

IN THE topaz, worn by those born in November, are found symbols of both the mighty hosts that make this month the battleground for the Struggle of the Seasons. The golden topaz seems to have condensed within itself the warmth and benignity of summer, and its clear yellows and dark browns mark the passing of fall. The cold, brilliant white topaz is the fit jewel to be worn on the icy fingers of winter that always clutch the land in their grasp before November has merged into the Christmas month. The blue topaz mirrors the blue of the glaciers, and the green is like the frigid depths of an ice-rimmed lake.

This gem was formed by vapors containing a large part of fluorine ascending toward the surface of the earth through fissures from cooling subterranean lavas and acting on surrounding rocks that contained considerable aluminium. The result was a complex silicate of aluminium with a high fluorine content, which formed long, slender crystals that were sometimes flattened along their length. Their tops were made up of a series of flat faces converging to a flat apex that is at right angles to the length. And all this took place long before November was created as a month, long before man himself roamed the earth!

TOPAZ FOUND IN ROCK
Below are ornaments made with the precious or true topaz, gem of November

The color in these crystals may be a light yellow, a rich, golden, sparkling wine shade, a light blue, green or orange, or a pink. Or they may be of no color at all. The stones have a hardness of 8, a weight 3½ times that of water, and a brilliance slightly less than that of the sapphire. Whether transparent or translucent, the luster is always glass-like. The most famous localities for the jewel are Colorado, Utah, Maine, New Hampshire, Brazil, Siberia, Japan, the Urals, Scotland, and Ireland.

Topaz was given by the ancients the powers of soothing anger, quelling the heat of boiling water, driving away nightmares and sadness, strengthening the intellect, sharpening the wit and bestowing courage. If worn on the left hand, it preserved its owner from sensuality. If powdered and taken in wine, it cured asthma, sleeplessness and other diseases. But its most famous power was that of giving light in the dark, as witness this quotation from Mani-Mali: "A topaz given by Lady Hildegarde (wife of Theodoric, Count of Holland) to M. Adelbert was known to give such a brilliant light throughout the chapel where it was kept, that prayer could be read without the help of a lamp."

There is an interesting story told of a London ship chandler who for years used a tremendous lump of pure

white topaz, weighing twelve pounds avoirdupois, for a door-stop! He later sold it for glass for three shillings, though its real worth was tremendous.

Another stone called topaz, and equally the November gem, is quartz topaz, so called to differentiate it from True Topaz or Precious Topaz, the aluminium silicate. It is silicon dioxide with an admixture of metals to give it color, and is identical to amethyst, except for its hue. It is slightly softer and less brilliant than Precious Topaz, but costs considerably less. The gem is found in Brazil, Ceylon, Russia, Scotland, Switzerland and Colorado.

The sons and daughters of the month of storms need never feel that when birthstones were being distributed they were slighted, because topaz ranks with the best.

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THE WAX-MAKING INSECT OF CHINA BY HERBERT BEARDSLEY

CHINA is a land of strange occupations, but surely none are stranger than those of the wax-farmer, who utilizes the labor of myriads of little insects to make his profit, and of the insect-porter, who carries on his back, for hundreds of miles, baskets of these wax-making mites from the Chien-Chang Valley, far above the sea, to the various farming places in the distant Province of Cze-Chuan.

Many hundreds of years ago, the Chinese discovered that the male larvae of a certain white insect, about the size of a mosquito, built, under certain conditions, a cocoon of pure, shining wax. They also discovered that the cocoons were not spun when the larvae were allowed to develop on the tree on which their parents were born, but that they required a different food. Years of experiment must have been necessary to make these discoveries, but at last the patient Orientals established the system whereby the insects work for them.

DEPOSITS OF THE WAX-MAKERS
Branches covered with the material manufactured by the insects and "farmed" by the Chinese

The tree that produces the white wax insect grows in the Chien-Chang Valley, and there, about March, one may see, on the limbs and branches, round, brown forms, which contain innumerable white insects. If they are allowed to remain where they are, they will eventually drop off in a dead mass, for the food is not right for them; but if they are transported to other kinds of plants, the females will lay their eggs, the larvae will thrive and the male larvae will construct their shining palaces, which yield a profit to the wax-farmers.

So, late in March, the insects are tied up in a leaf of the wood-oil tree, then placed in gourd-like receptacles which are packed into two large bamboo baskets. Runners or porters lift the baskets on their shoulders, and, traveling entirely at night—for to submit the insects to the midday heat would cause the pupal stage to end too soon—traverse the rocky paths and lofty ascents of the Cze-Chuan Mountains to arrive finally at the farming districts.

The baskets of insects are distributed to the farmers, who proceed at once to place the creatures upon the food plant, which is generally a species of flowering ash about five or six feet high. They are tied to the branches in small bags made of leaves, and holes are punched in the bags with a blunt needle so the adults may find their way out. When first emerging, the insects creep rapidly up to the leaves of the food plant, where they nestle for nearly two weeks. After this they begin to scatter and crawl along the branches.

About the first of June, the females begin to lay their eggs, and the wax cocoons are formed in August, in time completely coating every branch and stem. By the first of September the whole tree is literally covered with layers of pure white wax a quarter of an inch thick. The farmers then scrape the branches, and prepare the wax for the market. It is used in the manufacture of candles, temple images and other articles connected with ceremonial worship, and as a polish for furniture. The total output of the various wax-farmers is estimated to amount to about $200,000 annually.

The most picturesque features of this novel industry are the trips of the insect-porters from the highlands over the mountain passes to the land where the females lay their eggs. Seen at night, running with all their strength, dressed in most cases in rainproof straw suits, their flickering lanterns swaying to and fro with the motions of their bodies, they form a weird sight. During the time when they are on the march, the cities and villages along the route leave their gates open, so they can travel unobstructed. They never stop except during the day, when they huddle under cover of a shady retreat along the path, and protect their precious cargoes from the rays of the sun.

A PLANT WHOSE BERRIES BLUSH UNSEEN

BY FRED E. BROOKS

PHOTOGRAPHS BY THE AUTHOR

THE LEAVES OF THE FAIRY BELLS
One would not suspect that behind this, carefully hidden from the casual eye, lie bright red berries

GROWING in rich, cool woods all the way from Ontario to Georgia and Tennessee, searchers for wild flowers occasionally come upon a graceful perennial plant which bears the pretty name of Fairy Bells. Botanists know it as *Disporum lanuginosum*. For some reason this shy inhabitant of shadowy forests has never received the notoriety which it really deserves. The flowers are not showy, but the rather large berries are tinted in autumn with a shade of coral-red that is unusual and extremely beautiful. Few wild fruits are more strikingly colored.

The plant has a slender, upright stem which is branched and spreading at the top. The handsomely-ribbed leaves are rounded or heart-shaped at the base, taper-pointed, and are distributed alternately along the stems of the branching top. The small, bell-shaped flowers are greenish in color and are suspended, singly or in pairs, on thread-like stems from the under side of the branches. The flowers appear in the spring and when they drop are succeeded by a few elongate berries which grow and ripen slowly. In early autumn these green fruits begin to change gradually, through shades of pinkish-yellow, until they assume the rich coral of maturity. Each fruit contains from three to six bony seeds.

IN HIDING BEHIND THE LEAVES
Nature has apparently provided that the few seeds of the Fairy Bells shall not be gathered indiscriminately

Strangely enough, as one walks through the woods in autumn and looks downward on a fruiting plant of Fairy Bells, he does not see the berries. Each one is screened by a leaf which spreads directly above and hides it from all eyes that look downward. A person may see the fruits only by breaking or bending a plant, or by placing his face on a level with the under side of the leaves. Then the beautiful berries become visible. The uninitiated observer may walk among Fairy Bell plants and never suspect that so many bright berries are around his feet. Birds that fly above the plants must also remain in ignorance of the close proximity of what would appear to be inviting food. Most plants which bear brightly colored berries flaunt the seed-containing fruits openly, as though to tempt the birds. This being true, it seems remarkable that the Fairy Bells should tint its berries to catch the eye of birds and then conceal them from any species that may fly past. The trick would seem to defeat the plant's best purposes.

Let a robin or bluejay or flicker fly over a maturing plant of Jack-in-the-pulpit or ginseng or baneberry and as it glances downward it sees the inviting fruit displayed for it. It alights, feasts, (Continued on page 245)

No, this is not the face of a dweller in the jungle trees but is an enlarged closeup view of the face of a fly that goes by the name of Hypoderma diana. What appear to be eyes are the basal joints of the feelers and what appear to be ears are really the insect's eyes

FACES OF INSECTS

BY DR. WILLY RAMME

PHOTOGRAPHS COPYRIGHT BY THE AUTHOR

IT IS a surprising world, this world of insects, full of almost innumerable forms that boast an endless ingenuity. Not the least ingenious appears to be the facial formation that many of them have. One must, of course, look through a microscope to appreciate the astonishing physiognomic study that they afford. And one must also photograph them considerably enlarged to show the formation to those who cannot look at them through the lens that enlarges.

Naturally, there is usually a close connection between the formation of the head and the manner of living. Not only do we often recognize the predatory insects at first sight by the shape of their heads, but we can also tell whether in feeding they bite, lick or suck their food from whatever their favorite prey may be.

Suspiciously like a sword fish but actually the magnified face of a species of insect known as the Pryops from Sumatra

Two interesting forms are shown on this page, but as we delve into the wide field open to us we find variety to an astonishing degree. Not only do we discover some amazing grotesqueries among the faces studied, but we find much of beauty

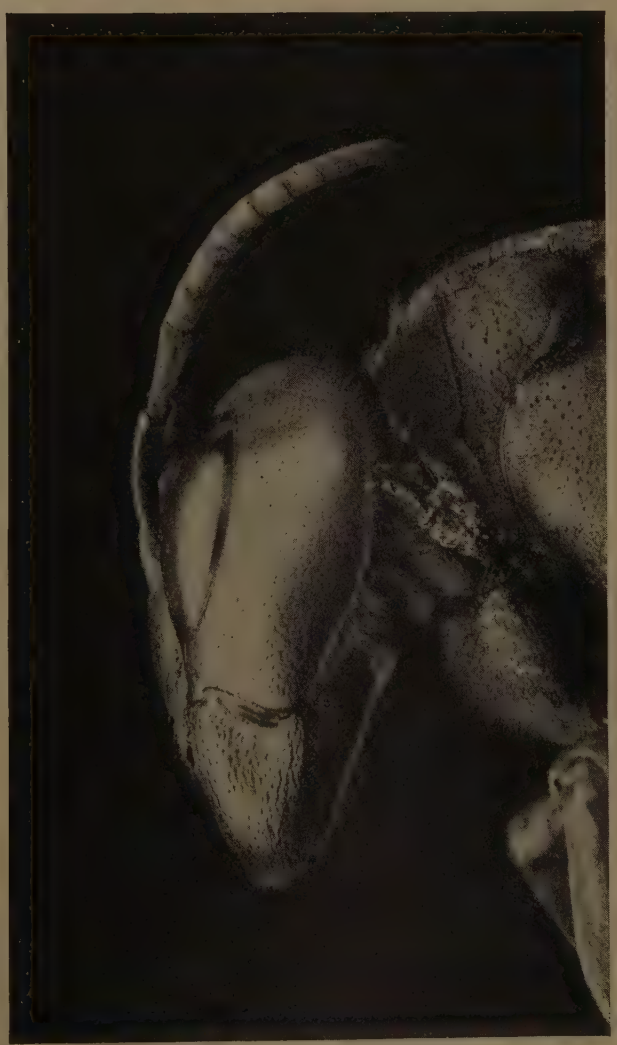
and of strength and of character. After all, that is about the range of results we get when we study the faces of humans in crowded subway trains, or, in fact, wherever men and women gather in such numbers as to give us contrast. In the insect world, of course, the faces have been adapted to their way of living and to permit them to carry on the battle where the fittest survive. But, by the same token, the faces of men and women bear the tell-tale marks of their contact with life.

But we will not go on with this lest our comparisons of insects and humans become invidious. Let us content ourselves with saying that study of insect life is just as fascinating as the study of human life. Try it some time and see.

At the top of this page we have the face of the African hedgehog locust looking for all the world like a head-on view of a rhinoceros. It is a massive head capable of doing much damage with its efficient mouth. Next below is the face of a Chinese moth of great beauty and interest, and it reminds us not a little of the face of an owl. The fan-like feelers are most beautiful in magnification. And, last, the head of the "nose grasshopper" that owes its name to the nose-like protruding upper head which bears the eyes and singular sword-shaped feelers.

Surely the faces of these three widely differing insects admirably illustrate the great range of facial variation in the insect world, as well as its fascinations.

On this page, directly above, we have the West African locust, Acridoxena, looking like an old robber knight with visor and coat of mail. Gazing intently at him is the giant locust, Saga, of East and West Asia looking especially "horsey". At our right the head of the East Asiatic hornet, Vespa, reminds us of the head of a stonebuck of the veldt. Below a tarantula represents the spiders and gives us the impression of something weird, perhaps a howler monkey of the jungle.



The interesting and complicated insect at the right is found in East Africa and goes by the rather descriptive name of "Devil's Flower". It belongs to the tribe of praying crickets and is a relative of the mantis. It is a predatory insect that appears in the disguise of a flower, the leaf-like parts on the lower side of the insect adding most effectively to this impression. Unsuspecting insects approaching this silently waiting and hungry "blossom" are instantly seized by the raptorial legs of the insect and—well, that is the end of it all.

Finally we have below the imposing profile of an insect from Surinam known as lantern-bearer, which exhibits for us the craggy head of a rhinoceros.

These are, to be sure, only a few of the myriad insects that would reveal curious and amusing facial formations. There may be some flying in your yard that would provide equally interesting subjects. Armed with something in which to catch them and with a microscope through which to observe them, one can never tell what strange experiences are in store when one studies our insects.

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BIRDS OF THE STATES

In the October issue of Nature Magazine were twelve colored pictures of birds that have been chosen as official state emblems. Twelve more of these State Bird pictures in full color will be published in the December issue. This will complete the publication in Nature Magazine of this interesting bird feature. Readers desiring to have this material in complete form, however, may obtain from the American Nature Association the sixteen-page, Nature Magazine size booklet on Birds of the States. See announcement of cost on the inside back cover of this issue.

"THERE STROLLED CASUALLY INTO VIEW AT MY FEET THE SQUAT FORM OF AN ENORMOUS BADGER. HIS BACK HAD A MIGHTY BREADTH. . . . HE CAME TO HIMSELF WITH A START AND A GRUNT"

FRIEND BADGER

BY A. BRAZIER HOWELL

ILLUSTRATED BY R. BRUCE HORSFALL

I HAD business at a large and ancient colony of mountain beavers in an aspen-choked gulch high upon the southward slope of the mountain. Guarding it was a wilderness of giant manzanita and, where innumerable springs seeped forth, a tangle of alders in knee-deep muck. Far off the beaten track, it was doubtful if man came this way once a year. The colony was a maze of large burrows in damp ground, their entrances packed hard by long use. A crystal rill, born of a bog at the gulch head, had enlarged the galleries near its bed and travelled as much under ground as above to where it leaped from a seam of rock to join the youthful river. An everlasting snow bank covered one side of the slope, sheltered from the rays of the summer sun and giving its life blood to help nourish the rill. All manner of lush growth crowded into the little flats along the banks, and the alders, just bursting into bud, were nibbled and barked where the beavers had fed upon them beneath their winter canopy of snow. A single cluster of five giant spruces stood guard.

A beaver colony is the stamping ground of many wild things. The little four-footed folk, and some of their larger kindred such as the marmot, use the galleries as highroads, or make their homes in burrows that have been abandoned by the rightful tenants. Minks and weasels and martens prowl through the labyrinths. Badgers, foxes and coyotes call regularly in hopes of a square meal. Then there are the beavers themselves—queer, squat, almost tailless beasts, their forequarters as massive as those of a bulldog and their hinder end even less consequential, with a disposition testy to an amazing degree. Their activities are limited to the hours of darkness, and, like the conies, they gather a store of herbage which they spread to wilt in the sun.

I had left camp early, plodded across a low wooded ridge and through a meadow by the brook, where I startled a doe into flight, her white beacon signalling progress as she disappeared into the timber. My ascent of the brushy hillside was punctuated by fox sparrows

and white-crowns whisking from beneath my feet. A mother mountain quail hopped to a rock and called danger, a numerous progeny of fluffy bits disappearing by magic into nothing at all. I took it easy, stopping frequently for breath and a look-see above and below. I had a load on my back and, in spite of the altitude and early hour, the sun was warm upon the tilt of the hillside. Deer trails led to the high ridges—dimly traced, converging, diverging in a maze through the thinner parts of the brush and I followed first one, then another, leaving them to force a way around a treacherous seepage gay with mountain blossoms. I was approaching the beaver colony and had stopped where a thread of trail skirted a steep declivity to watch a family of half grown Sierra grouse lined upon a rock and craning their necks in curiosity. A streamlet leaped from the ledge with a brave little roar, and a yard beyond me the trail was densely arched by knee-high verdure. Suddenly I became aware of a great quaking of the tops of these arching plants. Something was slowly approaching. I keyed to the thrill playing up my spine. What elusive creature was I about to meet? Perhaps a fisher or a shy Sierra red fox?

"HIS ONE CONSUMING DESIRE WAS TO BE ELSEWHERE, ANYWHERE, AND THE PROMPTEST ROUTE WAS DOWNHILL. DOWN THE SLOPE HE HURTLED."

Then, as if alone in an uninhabited world with no thought save that of ego, there strolled casually into view at my feet the squat form of an enormous badger. His back had a mighty breadth, the silver-tipped hairs standing far out from his round sides and forming a frame for face and beady eyes. As though awakened from a sound sleep, he came to himself with a start and a grunt. Such incredulous, horrified amazement was reflected in his countenance as he stood petrified that I could not repress a yell and a fling of arms, just to demonstrate to him what surprise really was like and to repay him for the fear he had implanted in the hearts of countless victims. He positively exploded and was galvanized into a ludicrous impetuosity that I have never seen equalled. His one consuming desire was to be elsewhere, anywhere, and the promptest route was downhill. Down the steep slope he hurtled, bounding twenty feet at each contact, his short little legs working furiously and indiscriminately whether upon earth or in the air. I could follow his retreat even after he himself had passed from view by the contortions of bushes from which he carommed in his one-minded purpose to demonstrate that the shortest distance between two points is certainly a straight line.

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Mr. Arthur Newton Pack, President of the American Nature Association, has recently returned from another camera hunting field trip. Interesting adventures and some fine pictures, both motion picture and still, resulted from the expedition. Mr. Pack has promised at least two stories based on his experiences and these will appear in early issues of Nature Magazine, the first being planned for December.

CHARLES DADANT, WHOSE VISION AND STEADFAST PURPOSE BROUGHT ABOUT A NEW DAY IN APICULTURE AND REFORMED A WORLD OF BEEKEEPERS

BORN IN FRANCE ON MAY TWENTY-SECOND, 1817, AND DIED IN HAMILTON, ILLINOIS, JULY SIXTEENTH, 1902, AFTER A LIFETIME OF NOTED SERVICE

CHARLES DADANT, BEE MASTER

BY KENT LOUIS PELLETT

DURING the late sixties the aplomb of Professor Hamet, influential editor of *l'Apiculteur,* was rudely shaken by the sensational articles of an obscure Frenchman named Charles Dadant, who had settled in America. The emigrant wrote the French bee magazines of enormous honey harvests in the new land; harvests that were two, four and ten times the ordinary crops. The unknown Dadant preached of movable frame hives and system *à l'Americain.* Hamet and his associates, smugly instructing their followers in skep beekeeping, resented his suggestion that their practices might be improved.

They knew. Hadn't an inventive French beekeeper named Debeauvoys produced a hive in which the combs could be withdrawn at will, and hadn't he thought he had reached the ne plus ultra in beekeeping? But the bees had glued the combs together, so they were no longer movable, and other similar hives had proved failures. So disgruntled bee men had returned to the straw skeps and fixed combs of their fathers, certain that it was better to let the bees control their own destinies. And this impertinent Franco-American, with his deluge of literature! He must be a braggart. Other contributors to bee magazines indulged in little ironies about "the torrents of honey the American beekeeper saw gushing everywhere about his hives". Hamet at first appended taunting footnotes to his articles, and finally in disgust ousted him from the columns of his magazine.

Still the little Frenchman wrote. He found an ally in a struggling little farm magazine that gave credence to his stories. This died a financial death—and the author, who was being laughed at from one end of France to the other, found *La Culture,* another farm magazine, which believed him enough to make him its beekeeping editor. Little did he worry about ridicule. He seemed determined that the French should try the American methods, for he wrote the French bee masters, "I have imposed on myself the task of reforming apiculture in France; like a mite I will pierce my little hole in the sombre veil before the eyes of beekeepers. The veil, eaten by the mites of progress, will be torn and will fall away". A doughty prophet of a new age. A fearless fighter with a prolific pen.

The flood of Dadant's articles found their way into most of the apicultural publications in Europe. Pungent, staunch articles that roused the opposition to fury heat. But his following increased, the new culture seeped into France, a tidal wave engulfing his enemies. Before the end of the century his large movable frame hives and his teachings were adopted by beekeepers in France, Italy, Switzerland and even Russia. The little, obscure emigrant had become "our master", and beloved leader. And he brought better crops and prosperity. The mite had done its work.

Who was this Dadant, who wrote and wrote, and fought, and finally had his way? He was a quiet, domestic man who spent many fond days in the company of his bees, and who all his life had held an eager passion for Nature. A son of the meadowlands of France he was, and when only a small boy had spent many happy hours learning to graft, practicing his art on his grandfather's waste land outside the city of Langres. Under his touch hawthorns became pears and medlars, and sweetbriers grew into roses of choicer species. The ignorant villagers who came to see his gardens were amazed, and dumfounded. He seemed to have a magic touch.

An admiring old priest, his friend, once gave him a straw skep of bees. Day after day he spent with them, watching their bumbling flight and listening to their honey songs on harvest days. Then he grew discontented

AN ADMIRING OLD PRIEST, HIS FRIEND, ONCE GAVE HIM A STRAW SKEP OF BEES. DAY AFTER DAY HE SPENT WITH THEM, WATCHING THEIR BUMBLING FLIGHT AND LISTENING TO THEIR HONEY SONGS ON HARVEST DAYS

with his pretty straw hive. He wanted to look into the lives of his bees as did Huber, who had dispelled by his experiments and writings the fog of myth surrounding the habits of bees and helped find their true biology. He wanted to perform experiments like this blind hero-naturalist. But the old priest had frowned on his ideas—shush, child, bees could never thrive in a home torn asunder every few hours at a boy's fancy.

A love for Nature, especially for bees, permeated Dadant's early manhood. He saved his money made as a young drygoods merchant at Langres, so that at middle life he might retire with his family to the quiet of the French countryside, there to devote himself to bees and grapes. He kept a few colonies of bees all the time to appease his great hunger, and still pried into their habits and rebuilt their homes, while peasant beekeepers feared him—one who sought out the secrets of his hives might bring misfortune to the neighborhood.

He never retired. The French revolution of 1848 wrecked his business and caused grass to grow in the cobblestones of the streets of old Langres. With high courage he refused to resign himself to drudging existence in the gray byways of some city, and came to the new world, where he carved a rural home out of a brush farm in western Illinois. And as days went by his friends the bees comforted him. Scores of colonies boomed on the shady slope in front of the house. Dadant spent hours in silent contemplation of their work; he worked and studied among them unprotected, knowing that one who understood them need not fear their stings. And his apiary helped to retrieve the family's lost fortune.

This little Illinois farmer was one of the first to sense the great change that was coming to the bee industry. He realized that it was time to break from the past—the ancient days when men had remained slaves to the whims and habits of the little insects for the honey harvest because they didn't know the inner workings of the hives. He saw that Huber had led the way, and that bee men must learn how to control the activities of the bees and regulate their numbers and food supply, so that always lusty battalions of worker bees would be on hand to gather honey when the nectar flowed. Men must handle the combs—must have movable combs—if beekeeping was to be made profitable. Dadant realized, as others did, that many men, among them Debeauvoys in France, had failed in their attempts to make such movable combs, but he saw more quickly than most men that the movable frame of Langstroth was nearly perfect. At last the apiarist could strike the vagaries from the lives of his bees and center their activities on the harvest.

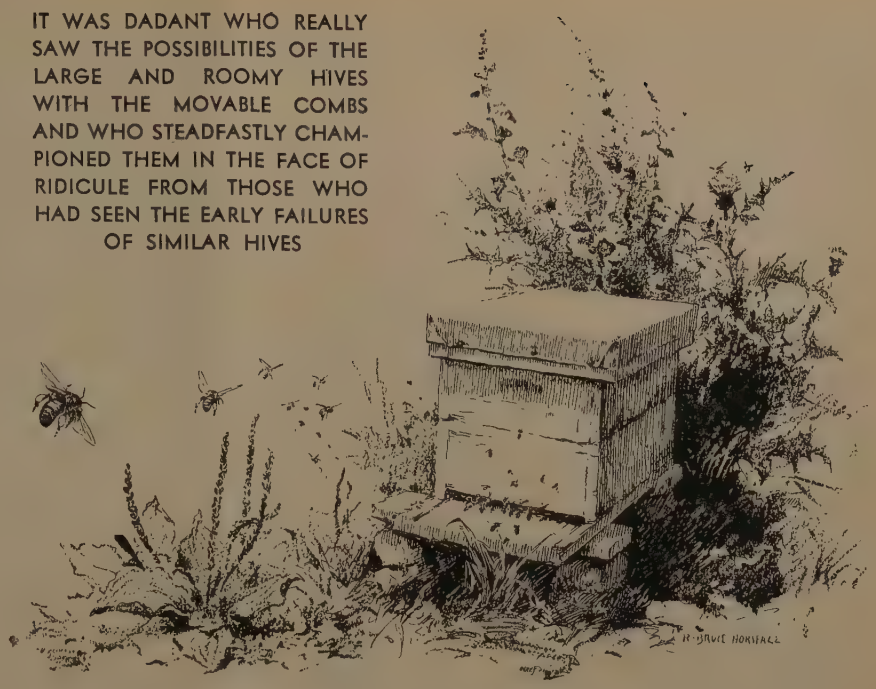
And while Americans were adopting the new system with enthusiasm, and assuring themselves of dependable livelihoods in a now certain commercial enterprise, Charles Dadant, bee master, started out on his campaign to educate his own countrymen, and unfold the new prosperity in his native land. He sought to oust the French beekeepers from their rut of superstition, to lead them to the new prosperity of the Americans. It was then that Hamet and his followers first laughed, then ridiculed, grew angry, and finally succumbed.

Dadant was always an experimenter, the young boy who had opened his skep hive. Never did he stop trying to learn about his bees. He carefully estimated the number of eggs that the queen bee could lay, and built his large brood chambers of a capacity proportionate to this laying. When the fad for small hives threatened to sweep the country, and writers believed that bees should be confined to such small brood nests that the queens would have no room for laying surplus eggs, thus concentrating the attention of the colonies on the harvest, Dadant fearlessly stood out against the idea. He refused

to mention the small hive in a book he was translating into French, though editors far and wide extolled it. And after the American beekeepers had nearly ruined their craft with the tiny homes, they began to ask how Dadant kept his bees, that honey crops came to him in such profusion. He pointed serenely to the large, roomy hives.

When he became convinced that the Italian bees were more gentle and industrious than the black bees of this country, he spent thousands of dollars importing queens from Italy, though he lacked ready money and lost his early shipments. Few followed this pioneer—too many things could happen to the little cargoes on their long journey. But he persisted, though his vigorous prolific bees were not of the popular golden color and were slow to find favor; finally, bee importing was a safe venture, and his bees were scattered so widely throughout the country that most Italian bees were of their descent.

IT WAS DADANT WHO REALLY SAW THE POSSIBILITIES OF THE LARGE AND ROOMY HIVES WITH THE MOVABLE COMBS AND WHO STEADFASTLY CHAMPIONED THEM IN THE FACE OF RIDICULE FROM THOSE WHO HAD SEEN THE EARLY FAILURES OF SIMILAR HIVES



When adulterators threatened to ruin the honey market with their spurious products, Dadant fired the beekeepers to wage war against them, to petition Congress for a law prohibiting the sale of adulterated sweets. The bill was buried in committee rooms, but the movement he started led to many state laws, and built up a groundwork for the pure food law of thirty years later.

Fighter, investigator, author, lover of Nature and a progressive, he wrote almost incessantly to the end of his eighty-five years, and his words have been disseminated more widely than those of any other writer on bees. He made enemies, but he was always respected, and the beekeepers of Europe loved him for leading them out of the shambles of the past.

His last days were spent on his little farm, midst his beloved rural surroundings and his home. And when he quietly passed away in 1902, he was mourned by the entire apicultural world. "Our venerated master is no more!" a French editor wrote in sorrow to his readers. But Charles Dadant's touch remains, and his loving, farseeing, forceful ways still guide them onward.

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WRITING ROCK—A MYSTERY

BY PEARL HEATH FRAZER

WHO carved upon the face of this rock these strange signs? Was it an Indian bulletin board, or is it the monument of some earlier race shrouded in the mists of unknown time? That is the mystery that surrounds "Writing Rock" in northwestern North Dakota. It is in Divide County and has given its accepted name to Writing Rock Township. As yet there seems to be no generally accepted translation of the carvings on the rock although some claim to have deciphered them.

The marvelous thing about these writings is how any race of ancient times, in central North America, could have carved with smooth carvings on this hard rock in a way possible today only by those most skilled in a trade. What tools were used or what methods?

This rock is placed on the top of a high hill in a sparsely settled district where the farm land is of little value. It is in the region of lignite coal mines and not close to any body of water of any size. From the top of the hill one may see many miles in any direction. Other similar rocks have been found in the state.

WINGS HALF RAISED, EYES WIDE OPEN IN ATTITUDE OF CURIOSITY

Then they would bend their heads way down and swing them slowly from side to side as if in mute but emphatic disapproval of something or other

TOM AND BETSEY

THE STORY OF TWO BIRDS, ONE OF THEM VERY WISE

BY ERNST KEIL

ILLUSTRATED BY R. BRUCE HORSFALL

Both Tom and Betsey were nearly full grown when they came to live with us. Also they were not friendly, and their natural beauty had suffered from life in a small cage that had injured their plumage. In their new home they found room to spread their wings. They discovered that up under the roof of their spacious cage they could escape sunlight and prying eyes. Their plumage soon became a coat of tan with beautiful light and dark shadings, and they seemed content.

Undoubtedly, before we go any further, we should say that Tom and Betsey were a pair of barn owls. That fact established, we can tell their story.

From the first it was a question of patience to gain the confidence of these two birds. Even with this, lavishly expended, they never really became tame, although they became more friendly, and could be handled with little trouble. Betsey, as became her sex, was gentle and posed willingly for the camera. Tom had all the shyness of some males when faced with the lens and raised shrill objection. He conducted himself as a perfect gentleman but he had firm convictions of his own about the matter.

Toward Betsey Tom was ever the gallant knight. Let visitors come and arouse his suspicions, and Tom would at once spread his wings and post himself to shield his lady fair, the while hissing angrily from a wide-open bill. Betsey, at such times, was the clinging vine, seeming to enjoy thoroughly the attentions thus bestowed. When confronted with something strange and unusual both birds would half raise their wings, stretch their necks, and look with wide open eyes at the object of their curiosity. Then they would bend their heads way down and swing them slowly from side to side as if in mute but emphatic disapproval of something or other.

After having enjoyed their company for several months we decided to return them to their natural haunts where they could be free and, perhaps, happier. One warm evening, right after dark, the owl-house was opened and we anxiously awaited developments. Tom, as usual, took the lead and was the first to venture outside. After some hesitation Betsey followed. Their astonishment was unbounded. A new world, bound by no wire screen, welcomed and surprised them. For a long time they sat on

the lawn, flapping their wings and craning their necks. First they flew to a clump of bushes nearby, finally disappearing among the rippling tree tops in the woods adjoining our home.

About three o'clock in the morning, two days after the birds' departure, we were aroused by a commotion on the porch. Investigation revealed that one of the owls had returned and was perching on the back of a rocking chair. A little later it could be heard clawing the screen of the owl-house. We were talking in low voices, speculating on what could have brought the bird back and what had become of the other one. It seemed that the sound of our voices gave it the cue, for suddenly it flew up to one of the screened bedroom windows and, balancing on the narrow sill, peered inside all the while with softly beating wings.

BALANCING ON THE NARROW SILL

Betsey peered inside the window, all the while softly beating with her wings

So much mute pleading could not go unheeded for another minute. I scrambled out of bed, donned a bathrobe and went outside. In the mellow moonlight I discovered our Betsey clinging to the wire netting of the cage, her spread wings covering her old home like a beautiful drapery. As I came near she loosened her hold and flew noiselessly to a grape-arbor a few rods away. The cage door swung open. A few minutes later Betsey entered and took up her favorite roost, apparently satisfied and contented to be with us again.

Next morning we went out to greet our bird friend. How she did swing her head and, judging by her actions, seemed as glad as we were over the reunion. She could not, of course, tell us of her experiences during the time of her absence. Perhaps Tom met with an accident, or the two became separated and gentle Betsey lost heart to shift all for herself. Who knows? How much we would like to learn just what flashed up in her instinct-regulated mind that urged her to forsake a natural state of existence and turn prisoner again. A prisoner loved and pampered, to be sure, but a prisoner nevertheless. Was it simply a bigger fear overcoming a lesser one? Somehow that formula does not seem to cover enough ground. Hunger through lack of training in the art of foraging was doubtless nearer the truth.

Every evening Betsey's living quarters were opened and she could go and come as she pleased. She took advantage of that and freely hobnobbed around the neighborhood, but, I am sure, never ventured far afield. The flowerboxes and chairs on the porch had a special attraction for her. She could be found there almost always the first part of the night, and before retiring I usually went out and admonished her to play in her own backyard and be sure to come home before sunrise.

As regular as clockwork, every morning at daybreak, Betsey made for home and her last stop was invariably the back of a rocking chair on the porch. The gentle swinging of the rocker served notice of our pet's safe arrival. From the chair she finally started on her last lap and by the time the first rays of the sun came peeping over the eastern horizon Betsey was in her house, ready for a well deserved rest. During the day her home was kept locked so nothing would disturb her beauty-sleep.

Then a morning dawned when we did not hear the rocking of the chair on the porch. Betsey had not returned. We never saw her again and often wondered what had befallen her. We do not know positively, but have our suspicions. There are two human "killers" living nearby, trapping and shooting in blind folly whatever happens their way. It may have been these vandals.

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Among the interesting features scheduled for the December issue of Nature Magazine is a fascinating story by Hamilton Lang entitled "Wigwagging in the Wild"—a story of some strange antics of our wild friends. Charles Fitzhugh Talman contributes another of his entertaining weather stories, this one of "Weather Toys" and what they really tell you about tomorrow. S. W. Frost writes about fishermen among the insects; A. Brazier Howell contributes another essay of the outdoors; August W. Pohndorf, Jr., concludes his birthstone series. There will be twelve pictures of birds and a cover done by Benson Moore, the noted etcher of wild life.

THE VOTERS IN NEW YORK STATE MUST DECIDE

Whether they will preserve their lakes that they may be enjoyed like this

Or whether they will allow their Adirondack lakes to become such as this

DEFEND THE WILDERNESS!

BY PAUL A. SCHAEFER

A fundamental conservation issue is placed before New York voters on November 8. It is hoped that the people in their wisdom will defeat the proposed amendment that would endanger the preservation of their great park.

"THE LANDS of the State, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall forever be kept as wild forest lands. They shall not be leased, sold, or exchanged, or taken by any corporation, public or private, nor shall the timber thereon be sold, removed, or destroyed."

Thus reads section 7 of Article VII of the New York State Constitution. Adopted unanimously by the Constitutional Convention in 1894, this "Gibraltar of Forestry" has withstood the test of time and weathered repeated attacks of commercial interests. Today it is the guardian of more than two million acres of State land in the Adirondack Park, a mountain region of unexcelled charm and rugged beauty except where man had earlier wantonly and ruthlessly destroyed.

A LAND THAT IS WORTH SAVING

The mountains and lakes of the Adirondack Park are a worthy heritage

Inspired by wholesale timber and land thefts in the Adirondacks, the Article became effective immediately upon the ratification by the people in 1895. The devastation of the despoilers had assumed such tremendous proportions, however, that the magnificent virgin forests of northern New York were sadly depleted. Great private holdings continued to be the scene of lumbering operations. Fire followed most of these cuttings and from time to time great areas of the protected forests went up in smoke. Acquisition of land by the State has hardly kept pace with the steady inroads of civilization, and its consequent development. The Article has served its ideal admirably and yet its real worth is just beginning to be recognized by conservationists generally, many of whom until recently have held that its terms were too strict for practical purposes. Its existence is the sole reason for the remaining glory of these "oldest mountains on earth."

At the polls this November the voters of New York will either reaffirm their belief in the forest protective instrument now an integral part of their Constitution, or they will adopt the so-called Porter-Brereton Recreation Amendment, which is in fact a nullification of the existing law. Briefly it is an "all tame forest versus part wild forest" decision they will make. The issue has assumed stupendous proportions, and conservationists the nation over have expressed deep concern as to the outcome. Unquestionably the future park policy of other major ranges will be directly affected by the decision.

A careful study of the issue (Continued on page 246)

NATURE RAMBLES WITH UNCLE DICK

A DEPARTMENT FOR THE YOUNG FOLKS

Bill Finley is the Field Naturalist and Wild Life Photographer of Nature Magazine's staff. He has had many wild pets, whose lives he has studied and of whom he has taken pictures. He has told this interesting story of a pair of them to Uncle Dick.

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RUBBER-NOSED BEARS

"AND what are those?" I demanded of Bill. We had stopped before a large cage in the yard. In it were two strange looking animals. They were about as big as raccoons. They had long tails with a thought of rings around them. They had black feet with claws like a bear's. Their ears were short and round. Their hair was white-tipped and reddish brown underneath. And their noses! They were long and streaked with orange and brown, and acted as though they were made of rubber.

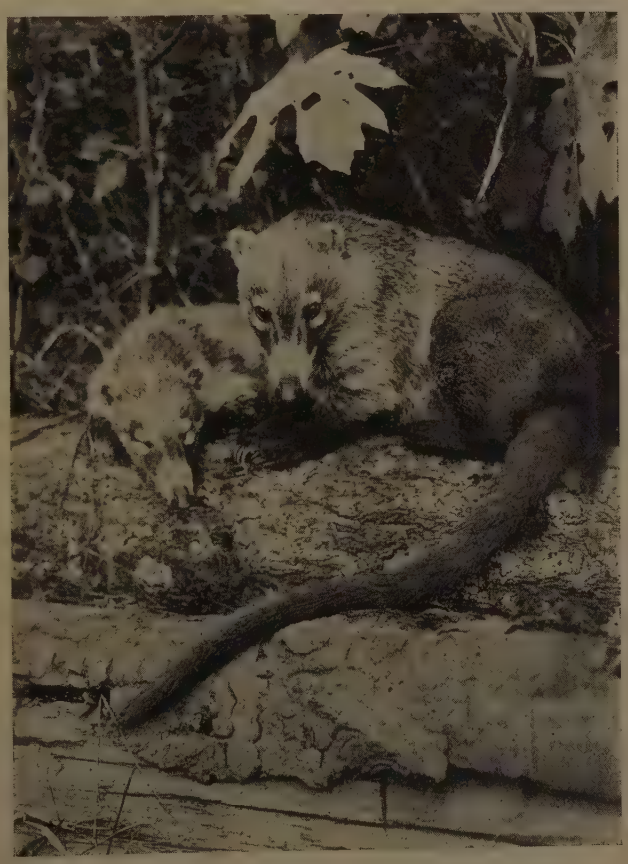
"Well," said Bill, "the fellow who sold them to me said they were Snookum Bears. That's a pretty good name. Matter of fact, they are coati mundis. The Mexicans call them *tejon*. That's where they come from —Mexico."

"They are the oddest looking beasts I've ever seen," I said, sitting down for a longer look. I startled one of them. He ran about, tail sticking up like a monkey's.

"They are funny," said Bill, sitting down, too. "It has been fun having them because we had to find out how to handle them, what to feed them and what to expect from them. Well, we have found out that they love fruit. They eat chopped fresh meat and cooked vegetables. Dessert may be bread with syrup or bread and milk. And custard pie! Now they surely didn't learn that in the woods of Mexico; and they have never been in the movies."

"Are they tame?" I asked.

"Not especially," Bill answered. "When they are together they are least friendly. Once the lady got out and was gone three days. Then the old boy and I got to know each other real well. I would sit in the cage with him and pet him. He seemed to like me and never bit or clawed. He missed his partner. And she missed him, too. She would come back to get the dinner we had left out for her. And I bet that sometimes, perhaps at night, she would come and stick her rubbery nose through the wire and rub noses with him. Finally one day we found her near the door to the cage. We opened and in she rushed. A minute later they were snuggled together in the corner, happy to be united again."



"THEY ARE THE ODDEST LOOKING BEASTS I'VE EVER SEEN"

"You say they come from Mexico?" I asked.

"Yes," said Bill. "There are two species. One is found in South America. The other comes from Mexico. Now and then they get across into the United States. They hunt in bands of several families. These bands include coatis of all sizes and ages."

"Have you gotten any good pictures of them?" I inquired.

"Surely," Bill replied. I should have known, of course, because Bill always gets a picture when he sets out to. "Had a bit of a time at first. Tried to put a rope around the hind foot of one of them. All he did was reach around with that funny nose of his and rub it off. The leg just slopes down to the foot and it was no trick at all.

"Then we tried putting a collar on. That would be easy, we thought. The coati did not seem to mind and we buckled the dog collar around his neck. We picked up the rope and looked around. With a sort of grin he put his forepaws up to his neck. The collar slid right down over his rubbery nose as though it had been greased. Finally we just took them out and photographed them."

Bill rose and so did I. We turned toward the terrace in front of the house, where we could look down on the river below.

"Yes," said Bill, "Nature does some funny tricks and the Snookums are one of her funniest."

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ABROAD WITH PEGASUS

On Pegasus, our white winged steed
We hope to travel far;
We'll stop for lunch on the Milky Way,
And dine at night on a distant star.

Our destination is the moon;
Our guide, who is from Mars,
Says the moon is made of lovely things—
Stardust and golden bars.

PUZZLE: Find the man in the moon

Perhaps it is the man up there,
Who flings the moonbeams wide and free,
So big and little forest folks,
Who go about at night can see.

And if we find him not at home,
That will be most unkind;
But we are sure he'll leave a note,
And be around for us to find.

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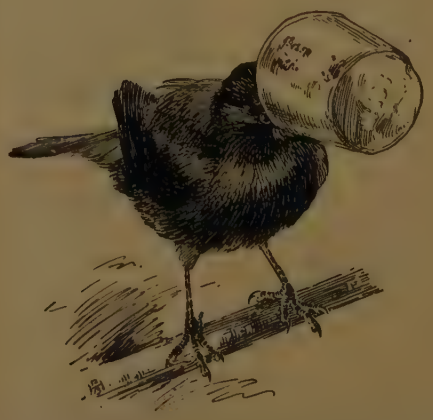
A SMART CROW

BY FREDERICK G. L. BOETTCHER

DRAWINGS BY R. BRUCE HORSFALL

JACK was a fish crow. His foster-parent was Nelson R. Wood, who had raised him. Mr. Wood was a taxidermist. He made bird groups for the United States National Museum in Washington.

One day Mr. Wood was studying a pose of a water bird that was to be in one of the groups. Jack was in his cage. Suddenly Jack let out a yell.



JACK LIFTED THE CUP OUT OF THE WIRE AND HELD IT IN HIS BILL

Mr. Wood jumped, dropping hammer, pliers and other things with which he had been working right on top of Jack's cage. This clatter scared Jack as much as Jack had scared Mr. Wood. The

bird dashed about his cage for a bit. Then he jumped on his perch, put his head on one side and looked at Mr. Wood. In a slow, deep voice he said, "Well! Well! Well! Well!"

This was the first time Jack had been known to talk. Mr. Wood wondered whether it was the surprise that had given him his voice. He knew that Jack had heard him say the same word in about the same way, so it was natural for Jack to say it.

This start at talking seemed to break the ice for Jack. He spoke other words, although none of these fitted the moment quite as well as "well!"

And Jack was smart in other ways. Mr. Wood had tried to keep Jack's cage clean. But the crow did not help him any. Half an hour after a meal Jack had mixed half of the dinner with the fresh sawdust on the bottom of the cage.

"I'll fix that," Mr. Wood said to himself. So he got a tin cup and twisted wire about it tightly, tying it thus to the wire of the cage. Jack came right over and looked at the new thing. He walked around it. He saw the wire and tapped it. Nothing happened. He walked around again and again, hammering the wire on all sides. We will never know whether Jack saw that the cup was bigger around at the top than at the bottom. But in a minute more he lifted it right out of the wire and stood there with the cup in his bill. His bright eyes looked at Mr. Wood over the edge of the cup as though to say, "Now, what do you think of that?"

Mr. Wood didn't argue with him. He decided that, after all, a fish crow isn't so clean about his own house, when it is a nest in a tree, so perhaps nothing could be done about it.

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A DOG'S PRAYER

BY WILL JUDY

COPYRIGHT BY THE AUTHOR

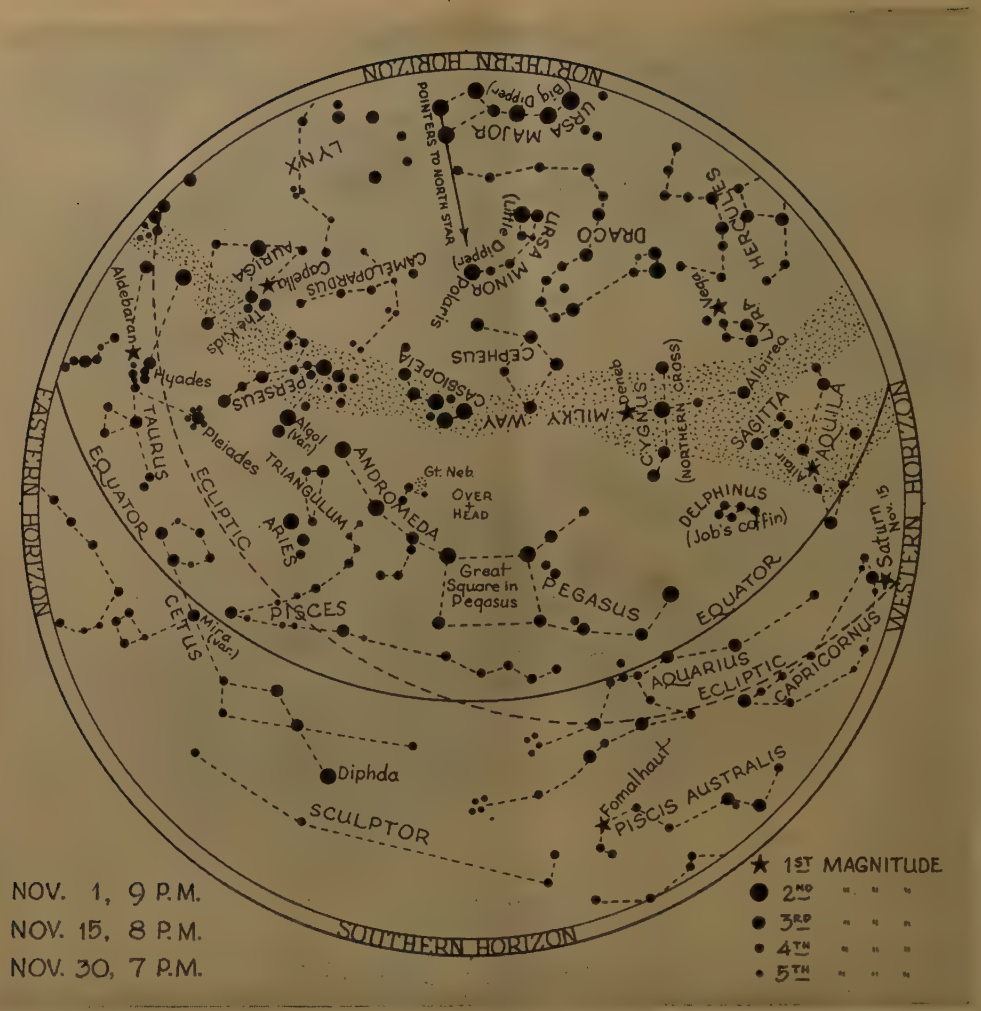
PHOTOGRAPH BY H. ARMSTRONG ROBERTS

"O LORD of humans, make my master faithful to his fellowmen as I am to him. Grant that he may be devoted to his friends and family as I am to him. May he be openfaced and undeceptive as I am; may he be true to trust reposed in him as I am to his.

"Give him a face cheerful like unto my wagging tail; give him a spirit of gratitude like unto my licking tongue.

"Fill him with patience like unto mine that awaits his footsteps uncomplainingly for hours; fill him with my watchfulness, my courage, and my readiness to sacrifice comfort or life.

"Keep him always young in heart and crowded with the spirit of play even as I. Make him as good a man as I am dog; make him worthy of me, his dog."



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

LOOK FOR THE LEONIDS

BY ISABEL M. LEWIS

THE LEONIDS are one of the most remarkable and at times spectacular of all meteoric showers. Although they appear every year in considerable numbers about November 12-17, something extraordinary may be expected of them at thirty-three year intervals. There are reasons to believe that either this year or next a spectacular display of Leonids may be expected. All interested in the study of meteors will be on the lookout for such a shower in the early morning hours of November 15, 16 and 17 when there is a possibility that a shower may be staged comparable to the great showers of Leonids that appeared in 1799, 1833 and 1866-68. Then thousands of meteors fell as thickly and silently as snowflakes a few hours before daylight.

Unlike the Perseids, which are evenly distributed around their orbit and return in considerable and nearly equal numbers every year, the Leonids are closely bunched in one part of their orbit and the earth encounters the densest portion of this swarm at intervals of about thirty-three years. So great is this closely-bunched portion of the swarm that it takes several years for it to pass its point of intersection with the earth's orbit. As a result an unusually large number of Leonids will be seen for a year or two preceding the year of maximum display and again for a year or so after. The appearance of Leonids in more than usual numbers in the years 1930 and 1931 seems to indicate that the time for a great display may be drawing near, especially as this year and next are the years in which the earth should be closet to the dense bunch of Leonids furnishing this spectacular display.

Predictions of the appearance of meteoric swarms, unfortunately, cannot be made with the high degree of accuracy that an eclipse of the sun or an occultation of a star by the moon can be computed. There are too many disturbing forces to be considered in the case of meteors which may switch our expected show from its scheduled course and completely ruin the anticipated performance.

The great disturber of the solar system is the planet Jupiter. Many a comet that has chanced to pass too close to this great body has been so "perturbed" in its motion that the form of its orbit has been completely changed. What is true of the orbits of comets is also true of those of meteors since they are closely associated with comets. The Leonid swarm, in fact, is travelling in the same orbit as Tempel's Comet which was discovered in 1866.

After the spectacular display of Leonids in the years 1866-1868 and with the knowledge that even more wonderful displays had occurred in 1799 and 1833 it seemed almost a certainty that the Leonids would stage another great show in 1899 or 1900. Unfortunately the great show never materialized and it was suspected that Jupiter was again the cause. To compute the effect of the perturbations caused by the planets upon the orbit of a comet or swarm of meteors is a long and complicated mathematical process. Yet it is not possible to predict with any degree of accuracy the return of these bodies in their orbits without taking account of the effect produced by the larger members of the solar system. Great preparations had been made to observe the anticipated shower of Leonids in 1899, and it was a keen disappointment not only to the astronomers but to the layman as well that the great display did not materialize.

Will the earth again encounter the dense bunch of meteors in the Leonid orbit which has a thirty-three year period, or has the swarm been permanently switched away from the earth by the perturbations produced by the major planets? Possibly the question may be answered this month. Remembering the experience of 1899, those who are interested in meteoric astronomy have little to say, but they will not be caught napping. The most probable time of the great shower according to the estimates of C. C. Wylie of the University of Iowa, who has made a detailed study of the subject, will be the early morning of November 16 in the United States. The most spectacular shower, it is his belief, will occur in the early afternoon of November 16 and will therefore be seen in Japan, China, the Philippines and possibly Australia. It will occur in those countries in the early morning hours of November 17. Tempel's Comet, travelling in the same orbit as the Leonids, is also due to come nearest to the sun this fall although the date is uncertain by several months.

The Leonids should be watched for several nights before the 16th and also on November 17, due to the uncertainty as to the time and place of the greatest display. As the Leonids appeared in large numbers last year there should at least be a good display this year even if it should not be spectacular. Prof. C. P. Olivier, President of the American Meteor Society and Director of the Flower Observatory of the University of Pennsylvania, also anticipates an unusual display of Leonids this year. Possibly it is not known to all of our readers that amateurs are invited to become members of the American Meteor Society and report their observations of remarkable meteors and also make and report systematic observations of meteors. The invitation is a cordial one.

The Leonids receive their name from the fact that their radiant lies in the constellation of Leo. Although meteors move in nearly parallel lines their paths appear to converge at a point called their radiant, simply as a matter of perspective. The Leonids are retrograding in their orbit, that is, moving in an east to west direction, instead of the usual west to east direction of all of the planets and most of the other members of the solar system. As a result we meet the Leonids "head on" in the early morning hours. Their velocity relative to the earth is forty-four miles per second. This is greater than that of the Perseids which come in August. Due to their more rapid motion they are more brilliant than the Perseids and their color is an intense white or bluish-white while the Perseids are yellowish in color.

They are seen under the most favorable conditions when there is no moonlight. As the moon will be several days past the full when the maximum display is due this year it will blot out the fainter members of the swarm, but the more brilliant meteors should be easily visible.

There are accounts in European, Arabian and Chinese chronicles of the appearance of great showers of shooting stars, the popular name for meteors, which are known to have been the Leonids. The first of these to be so identified was the shower of A. D. 902, so the Leonids are known to have been in existence at least a thousand years. The fact that the swarm is so closely bunched in one part of its orbit would imply, though, that it is a comparatively young swarm. In the course of time the meteors should be scattered, like the Perseids, more uniformly along their orbit as a result of near approaches to the planets, which are bound to occur from time to time, and which would tend to disrupt and scatter the swarm. Frequent returns to the vicinity of the sun at perihelion also cause both comets and meteors to be disrupted and scattered along their orbits due to the action of the sun. Comets have been seen to break up into several portions when passing close to the sun, forming what may become later nuclei of meteoric swarms travelling in the same orbit as the original comet.

A great display of the Leonids such as was seen and described by the noted traveler Humboldt in 1799, or by eye-witnesses all over the eastern and southern states in 1833, and again in 1866, would be a never-to-be-forgotten spectacle for all who might be fortunate enough to see it. Let us hope that the failure of the meteors to return in great numbers in 1899-1900, as expected, does not mean the permanent deflection of the swarm away from its point of intersection with the earth, but that it will again return this year in a degree approximating its former splendor. As meteors are mere particles of cosmic dust heated to incandescence by the friction engendered by their passage through the air they are in practically every instance completely consumed by friction before they reach the earth's surface. It is rarely that a member of any meteoric swarm ever falls to earth.

That they may not be caught napping in case the Leonids should return again in (Continued on page 248)

AN ODD HUMMER NEST

BY AGNES AKIN ATKINSON

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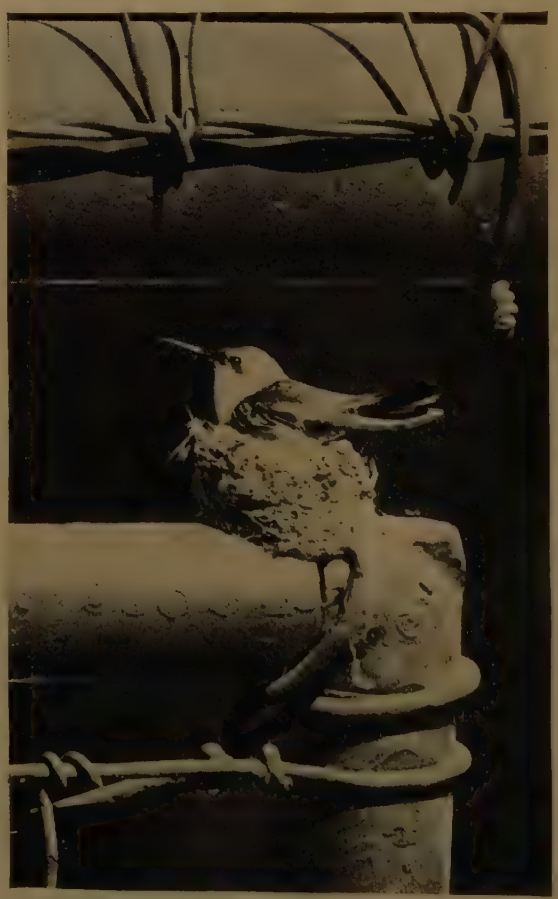
MOTHER HUMMINGBIRD WAS KEPT BUSY ANSWERING THE DEMANDS OF HER HUNGRY THOUGH TINY OFFSPRING

When poking her long bill down the baby's throat she always stood behind him so that she would not injure the youngster's windpipe while satisfying his hearty appetite

WHILE walking leisurely along in Eaton Canyon, California, snooping here and there for humming bird's nests, we found this unusual nest. It was moulded neatly and closely on a large rung of an iron flood gate which spans the stream bed in the middle of the arroyo. So smoothly and snugly was this nest moulded on the fence, that it took careful and cautious looking to find it. Nature has taught these little feathered friends the need for and the art of camouflage. The hummer usually selects low bushes and overhanging limbs of trees, often not waist high, in which to build her small nest.

Why this hummer built this nest on the iron gate, where it was completely exposed to the excessive heat of the sun, will always remain a mystery. There were many friendly bushes in the canyon, and on the arroyo bank grew steady trees with overhanging branches, ready and inviting, offering shade and protection. Mother hummer passed these all by, and for reasons known only to herself, chose the iron gate. She built this nest well and with great care, making it twice as thick as she had at other times built nests in bushes and trees. The sun's steady gaze must not penetrate this nest and cause heat from the iron to injure her eggs nor her babies. With this thought in mind, the mother hummer did not stop building until her nest was thick and snug. To the casual observer the nest looked like a part of the gate, so beautifully was it moulded and camouflaged.



A CURIOUS SITE FOR A NEST

To protect it from the heat of the sun on the pipe it was built thicker than is usual

In actual size a humming bird's nest is no larger than half of a hen's egg shell. The nest on the iron gate looked as though some one had taken both halves of the egg's shell and placed them one in the other.

No harm came to the nest nor to the birds, but something happened to one tiny egg. At first we saw two eggs. A few days later only one tiny egg rested snugly in the cozy nest. It was soon hatched by the proud mother. One egg—one baby; and this one baby kept the mother busy trying to keep the little hungry tummy full of insects and other baby hummer dainties. The baby's appetite grew as it grew.

As we watched this little family, we noticed each time the mother came to feed her baby, she always stood behind it to poke her long bill, filled with choice food, down the baby's throat. Should she stand in front of the baby bird to feed him she might injure its little wind pipe with her long bill.

Few birds could anchor the nest so firmly to an iron pipe that it would cling to the smooth hard surface of the metal through all the stress of sun and rain and wind. But the hummers build so compact a fabric and fasten it so deftly to the bark of the branches where usually they build, that even where the foundation rested on unfriendly metal, the web of spider or caterpillar with which the tiny architect moored her frail home failed not to do its duty, and helped the devoted parent to do hers.

THE POPO-AGIE APPEARS A CALM, DEEP POOL OF CLEAR GREEN WATER

At this point one would never recognize the foaming and whirling little river, born of the mountain snows, that roared into a cave a short way back

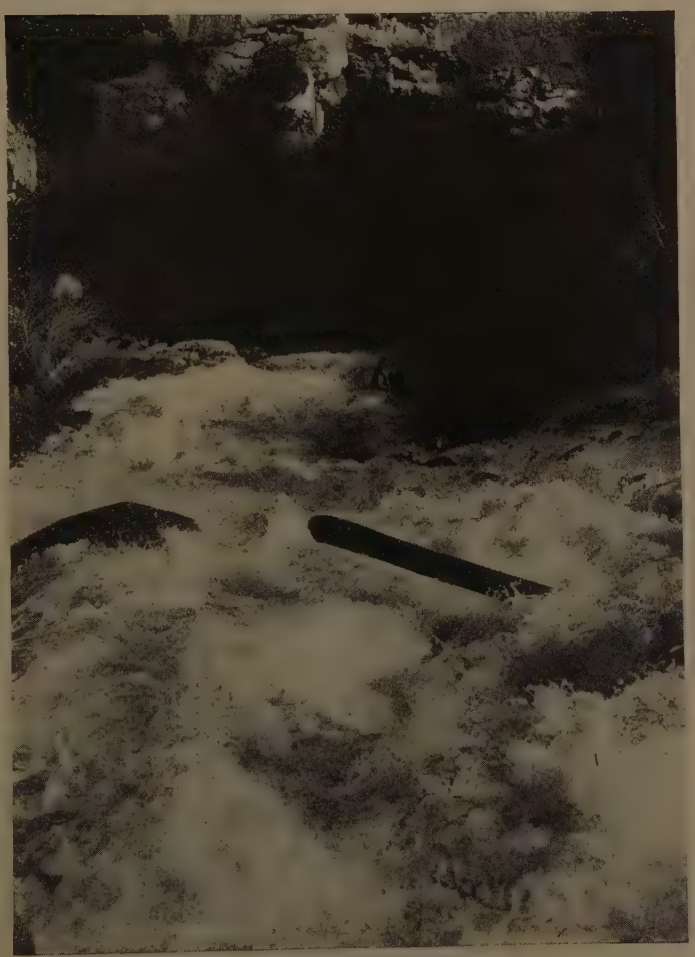
THE SINKS OF POPO-AGIE

BY MARGUERITE LOYD McGUIRE

PHOTOGRAPHS BY CHARLES E. SPROUL

IT IS a favorite trick of Rocky Mountain rivers to disappear for a time underground, come up suddenly and merrily ripple on their way as if nothing unusual has happened. The Popo-Agie River does this in an interesting manner in its canyon near Lander, Wyoming. The place is familiarly known as "The Sinks."

Fed by snows that lie always on the tip-top of the Rockies, the Popo-Agie River comes foaming and tumbling down the eastern slope of the Wind River Range, its rapids and cascades and waterfalls accompanied always by its wild, roaring song. But this capricious little river, that hurries along so untiringly over the boulders, does a curious thing in its flight through the deep canyon it has cut. It turns suddenly from its course as if pursued, flings itself headlong into the heart of a cave nestling low in the steep rock walls, and disappears. Less than half a mile below, on the opposite side of the canyon, it slips quietly up, a calm, deep pool that presently laughs itself into the old merry mountain stream again, in a hurry to reach the valley below.



MADLY THE RIVER FLINGS INTO THE CAVE

A roaring stream it disappears into its cave course, there to undergo a startling transformation

That the river has not always followed this course can be plainly seen by looking at the dry, deserted river bed that can be traced between the cave and the rising pool.

It is about "The Sinks" of the Popo-Agie that the Indians tell us this legend:

An Indian chieftain's favorite daughter had as her dearly loved childhood companion and playmate the river Popo-

Agie. She waded in its sunny pools, wandered along its aspen-fringed banks and listened to its wild, happy songs. When she was a maiden grown she still loved the river, and each day told to it her dearest secrets. This maiden loved, and had for her lover, a beautiful young warrior of whom her father greatly disapproved. The river listened to her secret, whispered longings for her lover, and in quiet places murmured its sympathy. After a time the maiden and her warrior planned an elopement, but not far had they journeyed on their way down the valley, closely following the river's banks, when they heard the sound of a pony's hurrying hoofs and turned to see the maiden's angry father in close pursuit. In terror, the maiden appealed to the river for aid, and taking her lover by the hand, she led him out into its foaming waters. Obedient to her appeal, the river turned from its course. It swept the maiden and her lover along on its crest. As it hurried toward the high rock wall of the canyon, a cavern opened for its coming. Still bearing its burden, the water rushed headlong into the cave and disappeared.

The father grieved long and loudly for his lost daughter; but the river never gave up the Indian maiden and her lover. Later, when the river came to the surface again in a serene green pool, two slender straight young aspen trees grew close together on its bank, looking at the mirrored reflection of their intertwined branches. Surely these are the contented spirits of the vanished pair.

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THE HARD-SKINNED PUFFBALLS

BY DR. WILLIAM A. MURRILL

Being the first of a series of short articles on those frequently seen woodland denizens, the hard-skinned puffballs.

THE hard-skinned puffballs differ from the true puffballs in having a hard rind, which is thick and often covered with conspicuous warts. The flesh is usually blackish, of uniform texture, and remains firm for a considerable length of time. The spores are rounded, spiny, and dark-colored. They are not mixed with a fluffy mass of fibrous threads, which would aid in their distribution, but escape gradually through irregular fissures or a star-shaped aperture at the apex of the fruit-body.

PUFFBALL CROSS-SECTION
Showing the hard rind of this particular group of puffballs

These plants may be found on the ground in woods. Although generally considered unfit for food, they are doubtless edible in very young stages if thoroughly cooked. Some of the species are frequently mistaken for truffles.

Although of world-wide distribution and easily recognized as a group, it is not so easy to distinguish the various species and many of them are confused in literature.

A common and widely distributed species, both in Europe and America, is *Scleroderma aurantium,* which

A MOST COMMON PUFFBALL
It is widely distributed throughout Europe and America and is found on the ground in dry woods

is found from late summer to fall on the ground in dry woods, especially under chestnut trees. It is a thick-skinned, rounded, somewhat depressed, nearly sessile plant about two and a half centimeters in diameter. Its corky pale skin with its yellow or orange shades is mostly covered with large warts. The interior is at first white, then becomes wine-colored, bluish-black and finally a greenish-gray with whitish markings. Its spores are dark, rounded and warty.

In northern Europe, it is sometimes called "red truffle," but it is not a truffle at all, although frequently used to adulterate real truffles. Persons have often brought specimens to me thinking they were truffles because of their size, shape, and warty covering.

Unlike the true puffballs, this species has little edible value and remains rather firm until quite old. When young, it cuts like a potato and has a strong odor and flavor in the raw state. Thorough cooking is necessary. The older stages are bitter and inedible, although not poisonous. Look for these interesting growths as you ramble.

ATTRACTIVE ENTRANCE TO THE ST. LOUIS GARDEN AREA

Community Gardens

In an editorial in the July issue of NATURE MAGAZINE we asked the question: "Food gardens—do they offer a remedy for unemployment?" This question is notably answered by the outstanding work being conducted in St. Louis through the organization of the Health-Thrift Community Gardens under the sponsorship of Mr. Julius A. Baer.

The application of this plan to St. Louis had its inception in a trip to Germany, during which Mr. Baer was much impressed by the home gardens that have been developing in Germany during the past twenty years. He found more than half a million home gardeners supervised by a national organization, and returned to this country convinced that the idea could be employed here. This conviction Mr. Baer carried into effect, just as did Mr. Charles Lathrop Pack in Lakewood, New Jersey. The St. Louis business man set about acquiring unused and often unsightly land, offered it rent free, plus vegetable and flower seeds and plants, for those who wished to take advantage of the opportunity. More than one thousand applications were received soon after the plan was announced. Already a remarkable transformation has taken place, and now crops are being harvested.

"But Mr. Baer's proposal," says an editorial in the *St. Louis Globe-Democrat,* "is not designed so much to meet any special stress in the food situation as to meet a stress that is felt by a certain strata of society at all times, good and bad. . . . Odd-moment employment that is pleasurable recreation, that will take men and women out of sordid congestion into the open, that will entertain and promote health and at the same time give outlet to a basic desire of man to dig and plant, to nurture and cultivate and harvest is the purpose of this commendable plan as much as the purpose of providing fresh vegetables for hungry mouths."

PHOTOGRAPHS BY J. G. PRINCELL

A REAL FARMERETTE AT WORK ON ONE OF THE GARDEN PLOTS

To take care of the practical supervision of the work, Mr. Baer brought from Germany a young man intimately acquainted with such an activity, a graduate of a German agricultural college, Mr. Eric Orf. The fundamental value of the community garden project cannot, perhaps, be better expressed than in Mr. Orf's own words. He says:

"While it is my belief that no one owes his fellow-men a living, I do think society owes everyone a chance to earn his daily bread. Therefore, any objections by the followers of the over-production theory to a system of individual home gardens enabling unemployed or underpaid honest men to earn food for their tables is ridiculous. As long as millions of men are idle and unable to supply the immediate needs of their families, while great surpluses of food rot on the ground or are used for fuel, it is evident that our problem lies in the distribution of wealth and buying power, and is not a question of over-production.

"While the present condition of our country calls for the adoption of economic principles and the time seems right to introduce the idea of thrift gardens, I see no reason why the thrift gardens should not be a permanent element in our civic life. In Europe these gardens have been known for the past thirty or more years and have proven themselves a great help in times of depression. It was with that thought in mind that our gardens were laid out on a more or less permanent basis and the applicants were not chosen from the needy and unemployed alone. Our gardens are open to any one who is sincerely interested in the growing and cultivation of vegetables and flowers. The applicant binds himself only to a few rules and regulations which are necessary to assure the efficient operation of the gardens. I attribute our success, in some measure, to the fact that our gardeners come from all walks of life. While most of them had never met or associated before, the gardens gave them a common interest which led to the discussion of the individual problems and efforts on part of the better situated, to solve the problems of their fellow-gardeners.

"Relief workers or those in charge of public and civic affairs who carry the responsibility of caring for the destitute, could profit greatly by analyzing the comparative results of money spent for direct relief and for a well-organized system of home gardens. The money expended by the various relief organizations throughout the country could be far more effective in giving relief, if given in such a way as to preserve a man's self-respect and fitness for work when it is available.

"The family garden as a recreation is a contribution to the courage, contentment and welfare of the jobless worker and offers a greater financial return than any other leisure time activity."

Brave Boys!

Progress of conservation in Marcus, Iowa, as reported in the *Sioux City Tribune*:

Marcus, Ia.—(Special)—A pure white mother owl and six little owls were found in a tree near Marcus. The baby owls were later killed by boys with sling shots, and the mother owl was badly crippled.

THINGS TO THINK ABOUT

A PAGE DEVOTED TO CONSERVATION FROM VARYING ANGLES

Migratory Waterfowl Shortage

On April 4, 5 and 6, 1932, the Special Committee on Conservation of Wild Life Resources of the United States Senate held a public hearing on the protection and preservation of migratory waterfowl in the United States. The report, covering 672 closely printed pages and carefully indexed, was printed in June. It is safe to say that, as a publication that reveals to the world the opinions and aims of both those who are destroying our waterfowl, and those who are trying to save them from destruction, it is the most enlightening document ever printed. We wish that a copy could be put in every American home where interest in wild life exists.

To this hearing came citizens from practically every state in the Union from California to Florida and Maine. They included ammunition manufacturers and dealers, duck hunters, representatives of sportsmen's associations, proprietors of shooting resorts, game wardens, lawyers and some conservationists. Naturally the nearby states were heavily represented—Maryland by more than seventy persons. Besides the oral statements made, there were many communications filed and all these are printed.

Anyone interested in the birds themselves cannot fail to note in this record a startling lack of ability or willingness on the part of the destroyers to look at the matter from a broad standpoint. The fact that a continental resource was the subject under discussion was scarcely touched on. Each gunner was interested in the ducks of his own bay or lake—during the hunting season—and the fact that these were bred a thousand or two thousand miles away was generally ignored. The ducks belonged to those who could kill them.

Much time was devoted to discussing, and much space to printing, the alternative propositions to impose a tax of one cent on each shell, or a tax of one dollar on each shooter. We have already expressed our belief that no vanishing species can be saved by a nominal tax on the shells that are killing them, nor on the killers. However, neither bill is likely to become law.

Shooting over baited waters, and the use of live decoys, were discussed by many. It is somewhat gratifying to note that the opponents of these practices seemed to outnumber the defenders. It should be borne in mind, however, that the advocates of such destructive practices prefer to confine their principal efforts to endeavors to prevent existing conditions from being changed, rather than attempting to defend the indefensible. Friends of the birds must remain alert.

One astonishing thing about the waterfowl situation is this—that by taking the most reliable available estimates of the relative numbers of waterfowl shooters and the annual kill the country over, there are apparently less than ten ducks on the average taken by each hunter during the season. Truly, the way of the sportsman is full of mystery. How he does struggle over those few ducks!

Of course testimony was given by a number of persons and organizations that are earnestly trying to save a part of the pitiful remnant that remains of our once unparalleled supply of wildfowl. Men and women came or wrote from all parts of the United States, testifying for Audubon Societies or other organizations, and pleading the cause of the birds with an earnestness that could not be doubted, and with expressions of the need for protection that carried conviction, and that must have caused the blush of shame to warm the cheeks of those who were urging more killing. Some of these pleaders were sportsmen—men who have themselves seen the once vast supply dwindle toward the zero mark, and who now see the true conditions. All honor to their courage.

But we find that the best that the friends of the birds could do was a two-month season. Two months of baiting and decoying, of driving of ducks from one shooting stand to the next through all the daylight hours, of killing and, what is worse, maiming as many as possible of the vanishing species. For even those who write the laws know that the harassed waterfowl can only continue to decrease under the conditions that now obtain. Beset by all the hazards that are a part of Nature's plan, faring south in autumn to escape the rigors of winter, they must still for two months run the gauntlet of thousands of guns, backed by a devilish ingenuity that it seems more fitting man should use to resist a deadly enemy than to turn upon his helpless neighbors. Considered by those who pursue them, not as beautiful and useful members of the fauna of a continent, but merely as something that furnishes sport in yielding up life, their vanishing ranks still the center of the Waterfowl Industry, for thus was the sport shamelessly characterized by some, our waterfowl face a short and hopeless future unless our boasted humanity shall soon assert itself.

Waterfowl Crippled by Hunters

The cruelty and useless destruction that accompanies waterfowl shooting under present day conditions is well illustrated by a bulletin furnished the press by the U. S. Department of Agriculture shortly after the close of the last hunting season. Tule Lake Bird Refuge, in northern California, near the Oregon line, is bordered in part by public shooting grounds. Since many of the birds seeking refuge must forage outside the sanctuary for their food, its vicinity affords special opportunities for shooting, especially in this region of dwindling water. Some of the birds that are wounded, but escape the hunters, find sanctuary far within the refuge, and there die or live, as fate decrees.

In late November, 1931, toward the close of the shooting season, rescue work was begun by the reservation protector, and was continued until January 5, about three weeks after hunting ceased. The number of birds that died from their wounds on the refuge is not recorded, and probably was not ascertained, but 1,359 ducks and geese that were mortally wounded were given to local charitable organizations for food, and 1,865 were rescued and placed in pens. About two thirds of these recovered and were banded and liberated. While shooting was in progress the hunters were allowed to enter the refuge without their guns, to recover what wounded birds they could, so those found by the protector formed only a part of the birds actually crippled. The number killed and recovered by the hunters outside the refuge is unknown, and therefore the proportion of the total that were wounded cannot be ascertained.

The incident was aired in the local press, and considerable unfavorable comment on the carelessness that condemned so many innocent birds to suffering resulted. In the keen competition that accompanies the gathering of even a reasonable bag many long shots are risked, and the less skillful hunters now cripple altogether too many waterfowl. Competent observers who have given the matter careful consideration conclude that in many cases the ducks crippled number as many as those that are killed outright. The rules of some ducking clubs, which forbid pursuing the cripples while the shooting is in progress, increases the cruelty and waste. Naturally, the conditions that result are seldom described in print, but in some instances friends of the birds have described instances so revolting that they should shame the most hardened offender.

The Use of Live Decoys

As our stocks of waterfowl diminish under the tremendous onslaughts that are made against their ranks in the interests of sport and commercialism of various sorts, the methods used to bring the birds to bag must continue to be scrutinized and revised. The history of the change in practices reveals some ethical improvement, but one whose snail-like gait has always failed to keep pace with the diminution of the birds. As they became more scarce, and learned more about guns, and as men grew to love ease more, the diabolical custom of luring waterfowl within range by a flock of their fellows that had been trained, but were more or less under restraint, became an established custom. It is an expensive one, for the birds must be reared and cared for throughout the year, to be used only a few weeks each fall, but what will men not do to experience with the least effort the thrill of outwitting a wild bird, and pitting with a charge of shot a creature whose social instincts lead him to seek pleasant company?

But as we see our waterfowl diminishing faster and faster under the myriad handicaps that our civilization imposes, the degradation involved in this fiendish practice has gradually been forced to our attention. We are beginning to wonder if we can longer afford to permit this atrocity to be added to the advantages that man in his ingenuity has marshalled in his efforts to get the better of wild creatures that we have been taught an all-wise creator put on this earth for the pleasure and use of man, but still furnished with wings.

We will refrain from reviewing the arguments that this creature man, reputed to be made in the image of God, and only a little lower than the angels, but who has attained to a marvelous skill in the use of words without thought, has assembled in his attempt to justify the use of living decoys. But we see signs that indicate that an awakening conscience is manifesting itself.

A PLANT WHOSE BERRIES BLUSH UNSEEN

(Continued from page 222)

and afterward, when the food is digested, drops the hard seeds, some in fields, some in woods, but whether the seeds fall in stony places where the sun scorches them, or among thorns where they are choked, some are sure to drop on good ground where they spring up and bring forth, some even more than a hundredfold. For the Jack-in-the-pulpit and baneberry and ginseng bear so many seeds that they can afford that a portion be lost. But the Fairy Bells produces comparatively few seeds, and the plant, in order to hold its place in the crowded vegetable world, must conserve its seeds and not permit them to be swallowed by far-wandering birds that would almost surely drop many of them on unfertile soil.

One may conclude that the Fairy Bells spreads its table, not for the roving birds, but for species more sedentary that make their constant home in just such woodsy places as the plant chooses for its own haunt. By such stay-at-home birds, a larger proportion of the seeds would be dropped on what, to the plant, is good ground.

To the person who by observation is well acquainted with the haunts and habits of wild birds and plants, that fine game-bird, the ruffed grouse, will at once come to mind as a possible host to which the Fairy Bells offers its brightly-hued store. As the ruffed grouse walks over the leaf-carpeted ground of the woods in search of food, as is its habit, it encounters the berries of the Fairy Bells hanging on a level with its head and dangling temptingly before its eyes. It swallows and digests the pulp of the fruit and drops the hard seeds, almost surely in a situation favorable to the seedlings that may sprout next spring. Thus, each is a benefactor of the other. The grouse profits from the food offered by the plant and the plant profits from having its seeds sown by this particular bird.

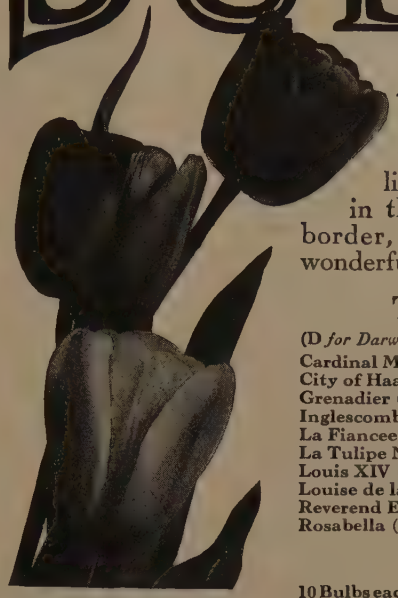
True to Form

Apparently the instinct of heredity triumphs over the accidents of environment. Reports received by the Canadian National Railways from Australia concerning two buffalo sent there a few years ago from Wainwright Park, Alberta, indicate this to be so. When it is winter in Australia it is summer in Canada but the Canadian buffalo go about the business of shedding their heavy overcoats just as if they were at home, taking no note of the topsy-turviness of the seasons. When it is summer in Australia they put on their heavy coats and when it is winter they get into what would be their summer garb in Canada. Oh, well, let the biologists worry about it.

Rare Consideration

A mother robin provided a lot of back-breaking work for Jack Kovenz and William Kuchel of La Porte, Indiana. The bird built her nest on a stone derrick and laid four eggs in it. One day, however, a flat-car rolled in with fifty pieces of stone weighing three hundred pounds each. The derrick was needed, but the two stone cutters did not want to disturb the nest; so they moved the whole carload by hand.

BULBS



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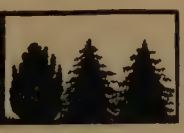

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(Continued from page 234)

as a whole reveals many interesting facts, foremost among them being that while the conditions which actuated section 7 of Article VII have themselves been controlled, far greater problems of forest preserve exploitation must be met than those which existed in 1894. Scenic regions free from commercialization have become increasingly scarce until today it takes but little vision to see that unless conservationists fight hard in every quarter, the wilderness is doomed!

According to its author, a chief reason for the amendment is a desire to see the forest preserve "open to the public for recreational uses and not frozen in as a jungle for wild animals." Such a statement is indefensible in the light of facts.

More than half the entire seven thousand square miles within the Adirondack Park are still privately owned and subject to development of any description. Hundreds of thousands of acres in the heart of this so-called "jungle" are barren of trees and lack any semblance of being park lands. They are a tragic reminder of the wanton destruction which prompted constitutional protection. Hundreds of hotels dot the entire area, some of them little removed from the high peak region. A network of roads enables one to visit virtually any part of the park without having to spend a single night out-of-doors. There are thriving towns and villages with one-way streets, theatres, underpasses and most of the other adjuncts of our larger cities. Private interests control hundreds of thousands of acres of wooded areas in the heart of the park. Great lumbering operations are at this moment stripping the upper watershed of the Hudson River of its all-important trees. On the shore of what is quite commonly called "the most beautiful lake in America" a five story hotel has been built.

It is proposed to build "recreation buildings" which would be operated for gain on public lands. The nature of these buildings not being specified it is inevitable that soft drink stands, dance halls and other undesirable buildings would in time become located in the rest of our scenic regions. Trees could be cut for all of these purposes. The amendment also stipulates that existing public roads may be improved. Almost any sort of a trail could legally be termed a road and promiscuous road building would ultimately result. Under the present law, by direct vote the people decide just where highways can be constructed. This voice in the development of the park would be lost if the amendment is successful. Also, unless specifically indicated by each legislative act, the Conservation Department would have no jurisdiction over the various projects authorized by the amendment. The harm possible because of such wide diversification of control is almost incalculable.

Every type of recreation may now be found within the park. Nearly half a million people used the State campsites last year. These sites, in all parts of the park, are in charge of rangers and have many modern conveniences. Hundreds of thousands took to the foot trails and the open shelter system was used more extensively than ever before. Other hundreds of thousands enjoyed the various amusements operated by private enterprise.

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Read how one family solved this difficult problem by changing their mental attitude from futile sympathy and coddling to a constructive program placing the patient in natural competition with companions of his own age. There is a hopeful message here for every parent whose child has had infantile paralysis. But the sensible philosophy of the article will apply with equal success to the care of any physically handicapped child.

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Gossip over the teacups or the back fence has made many a prospective mother miserable. If you are in the market for a baby this season be sure to read **"You—before Your Baby Comes."** In this article Dr. George S. Stevenson clears away a good many misapprehensions.

It may be a revelation to you to learn how it is possible to speed up the healing effects of Nature by use of its own forces. In **"Physical Forces in Healing"**, Dr. Richard Kovacs explains in a simple and enlightening way the effects of ultra-violet rays, diathermy, the electric knife, and the electric muscle stimulator.

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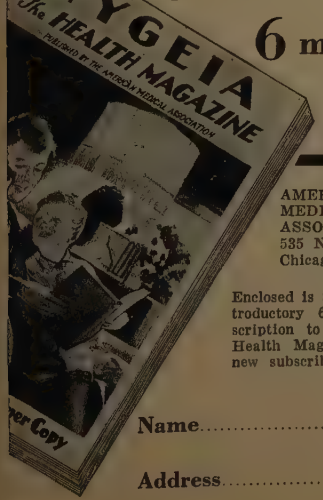

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Need more be said about this "jungle for wild animals?"

Conservationists should remember that the constitutional limitation of development which affects the Adirondack Park does not apply to the State production forests outside its boundaries, nor to the large number of lesser State Parks where all kinds of amusement buildings are not only permitted but encouraged by the government. It should also be remembered that this is our last frontier, and even on it and with the aid of section 7 of Article VII it will be a tremendous undertaking to preserve the natural woodland character, the value of which is just beginning to become recognized.

What of the youth of tomorrow? Shall we bequeath to him a land stripped of wilderness? Or shall he be heir to a region magnificent with hulking mountains, long reaches of forest giants, quiet woodland trails with the gem-like lakes and tumbling rivers beyond? And shall we preserve for him a place, where in the shadow of the hills he can pitch his tent, and there by the side of his glowing campfire, exult in knowing that strange new experience of being in country untamed?

It is not enough that all of our major conservation organizations have taken steps to defeat this new attempt to exploit our mountains. It is not enough that the Governor, his Lieutenant and such public-spirited men have declared themselves opposed to the proposal. Individual, self-actuating effort is the only antidote for the mass indifference such as exists on this question.

We must remember that defeat means disaster!

Rocky Mountain Mammals

There comes to us the first publication of the newly-formed Rocky Mountain Nature Association, which is the organization of those interested in the natural history of Rocky Mountain National Park and which centers about the Park Naturalist work of Dorr G. Yeager in that park. This first booklet is entitled *The Animals of Rocky Mountain National Park* (we wish it might have been "mammals", which it really is) and gives a thumbnail sketch of the mammals of that area. The booklet is mimeographed in pocket size but bound in a heavy cover, comprising in all some sixty pages. These publications are free to members of the Rocky Mountain Nature Association and otherwise available at fifty cents a copy from Frances B. Yeager, treasurer of the Association, at Estes Park, Colorado.

A Bird Battle

Elmer Bradford of Nutley, New Jersey, maintains a cafeteria for bird friends and reports that recently while a sparrow was quietly lunching on a piece of bread a blackbird descended upon him, badly pecking him about the head. Down swooped several other sparrows and started a gang war on the blackbird. The injured sparrow was doctored and seemed to have a good chance of recovery. Later in the day Mr. Bradford's son saw something strange and still in the bird bath. He investigated and it was the blackbird stretched out in the bath, lifeless.

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Many people who *should* be writing become awe-struck by fabulous stories about millionaire authors and therefore give little thought to the $25, $50 and $100 or more that can often be earned for material that takes little time to write—stories, articles on business, fads, travels, sports, recipes, etc.—things that can easily be turned out in leisure hours, and often on the impulse of the moment.

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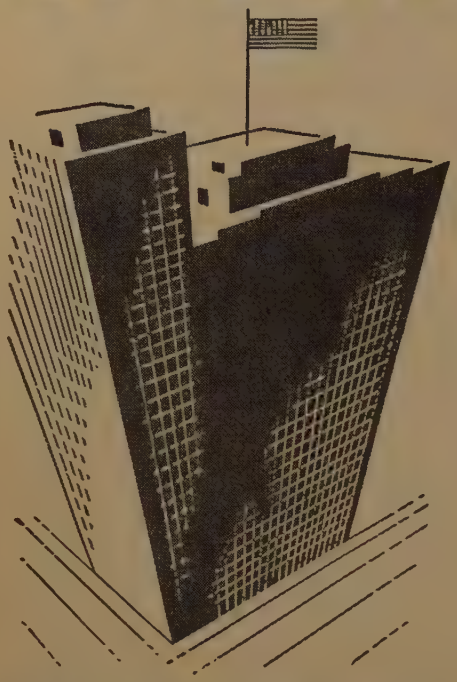

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LOOK FOR THE LEONIDS

(Continued from page 239)

great numbers this year, those who are interested in meteoric astronomy will be abroad in the hours from midnight to dawn on November 15, 16 and 17. If the Leonids then fail to appear it is probable that the densest part of the swarm has been switched completely away from its point of intersection with the earth, by the action of one of the major planets.

In the evening sky this month the planet Saturn will be seen due south at sunset on November 15 in the constellation of Capricornus. Mercury will reach its greatest elongation east on November 14, and will be very low in the southwest at sunset on that date. Venus is now a beautiful object in the southeastern sky before sunrise. Mars rises about midnight on the fifteenth and is in the constellation of Leo, close to Regulus on the northeast and not far from the radiant of the Leonids. Jupiter passes from Leo into Virgo this month and rises in the east about 1:30 A.M. on the fifteenth. It lies some distance to the southeast of Mars and Regulus.

The Great Square in Pegasus is now conspicuous in the early evening lying just south of the zenith. The second magnitude star Alpha Andromeda marks the northeast corner of the Great Square and the constellation of Andromeda may be identified by this star and the two other second magnitude stars that lie in line with it to the northeast. Perseus follows Andromeda, close on the northeast. Capella in Auriga in the northeast and Aldebaran in Taurus in the east are now conspicuously in view. Orion is now rising on the eastern horizon. In the western sky Aquila with its first magnitude star Altair and Cygnus, in the path of the Milky Way, are still conspicuously in view. Vega, in Lyra, is visible in the northwest and the Big Dipper rests with its bowl almost on the northern horizon, while Cassiopeia lies on the meridian high above the pole, in the path of the Milky Way, which now arches high across the heavens from Gemini, on the northeastern horizon, to Aquila, in the west, passing through Auriga, Perseus, Cassiopeia, Cepheus and Cygnus.

Fomalhaut, the farthest south of all the first magnitude stars now above the horizon, lies quite alone in the southwest below the constellation of Aquarius, The Water-Bearer.

Diphda, the second magnitude star, which is the brightest star in the huge constellation of Cetus, The Whale, which, with Pisces, fills much of the space in the southeast and south at this time, stands also in a solitary position east of Fomalhaut.

A Snake Story

Rufus Page of Davidson, North Carolina, writes us of an experience with his snakes that has elements of drama as well as interest from the viewpoint of observation. He says:

"I had a most interesting experience last summer in regard to the unusual vitality of the common black racer, *Zamenis constrictor.* One of my favorite king snakes being hungry, I locked a large blacksnake, some eight or ten inches longer than the king, in the same cage. Instantly a fight ensued which lasted 45 minutes by the Ingersoll, during which time the black-

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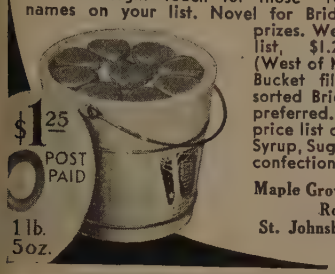

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snake wounded the king snake time and again, drawing blood more than once. Finally, however, the king got the upper hand, and stretching the black out straight began to swallow, head first as is customary. He evidently relished the idea, for in another 45 minutes the blacksnake was down to the king snake's vent. Seeing that, try as he would, he could not accommodate the blacksnake, the king snake expelled him in an instant—quick as a flash. The black lay stunned for a moment only, then slowly 'wagged his tail', extremely thankful, I suppose, for the fresh air and sunshine of which he had been so rudely robbed. I bathed this particular specimen in cold water, replaced him in his own cage, and turned him loose at the close of the season, none the worse for his encounter of several weeks before."

Grayling in Yosemite

BY C. C. PRESNALL
JUNIOR PARK NATURALIST

Disciples of Izaak Walton will rejoice that a successful planting of Montana grayling has at last been made in California waters. Repeated attempts to introduce this desirable fish have failed until this year, when the Yosemite Fish Hatchery reported unusual success in planting the grayling in one of the high lakes of Yosemite National Park. A recent examination of this lake showed that the fish planted there two years ago were not only growing at an amazing rate but were already reproducing successfully.

As reported by Peter Topp, foreman of the Yosemite Fish Hatchery, who visited the lake in company with Ranger Sam King on August 11, the fish had attained a length of 13½ inches and weight of ¾ of a pound. He also saw many young grayling that had hatched this spring and reached a length of one and one-half inches. Most of the grayling, of which 45,000 were planted immediately after hatching on June 19, 1930, seem to have moved down into the stream below the lake. Both the lake and stream, located at about 9000 feet elevation, contain abundant food, which will, in Mr. Topp's opinion, assure rapid natural reproduction in all the adjacent waters. In order to give the fish every opportunity to succeed, Chief Ranger Townsley has agreed to keep the area closed to fishing for several years.

The native haunts of the Montana grayling are limited to the tributaries of the Missouri river above Great Falls, where it is famous as a game fish of fine appearance and delicate flavor, sometimes attaining a weight of over two pounds. There are but two other species of graylings in North America—the Arctic grayling and the Michigan grayling. The family to which they belong, Thymallidae, is closely related to the Salmonidae (trout and salmon), and the grayling in habits and external characteristics closely resembles a trout. The chief marks of distinction are the iridescent silvery gray color and the extremely long and high dorsal fin.

This first successful planting of Montana grayling in California will be watched with great interest by sportsmen throughout the state, and doubtless other high lakes and streams may be stocked successfully by following closely the procedure developed in Yosemite by Mr. Topp.

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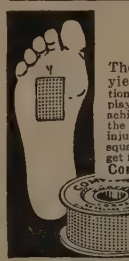

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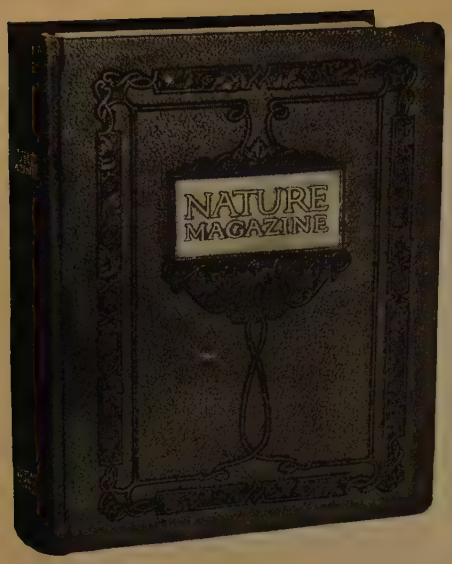

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Lycosa, The Wolf Spider

FROM NATURE NOTES OF ACADIA NATIONAL PARK

We were following a dirt road not far from the Kebo Valley Club when suddenly one of the party who had gone on ahead called my attention to a large, dark-colored, hairy spider in the road, by far the largest spider I had ever seen in Maine. Taking a cyanide bottle from my knapsack, I opened it, held the open end immediately in front of our intended victim, and then coaxed the specimen into it. She came with such a rush that the impact against the bottom of the bottle dislodged fully a dozen spiderlings who had been riding on her back.

This animal proved to be *Lycosa carolinensis,* the so-called "Wolf Spider"—probably the largest species of spider which is to be found on Mount Desert Island. From the clawed tips of her forefeet to those of her hind feet she measured exactly three inches, while the distance from head to tip of abdomen was slightly over one inch. The entire upper hairy covering was a soft gray-brown without any distinct markings. The eyes, as in most spiders, were eight in number and were arranged in three rows, two in the upper and middle rows and four in the lower row. Those in the lower row were considerably smaller than the upper two pairs of eyes. Below, the hairy covering was for the most part a uniform velvety black. The chelicerae, erroneously known as "mandibles," were coated with amber-colored hairs and at their base, on the lateral face, was a conspicuous, smooth, orange-colored articulating condyle. This condyle is especially noticeable when one is looking into the face of the spider. The sight of such a creature would give many people an unnecessary scare, but like all other spiders which are to be found in Maine, the large Wolf Spiders are harmless to mankind.

The generic name of this spider comes from *Lycosa,* which is from the Greek word for wolf. This name has been given to these large hairy spiders because they are hunters who chase their prey. Other spiders obtain their victims by lying in ambush, by building various kinds of nets or traps, or by living with other spiders and eating at their table.

Lycosa, like certain other spiders, carries her white globular egg sac attached close to her spinnerets by a bundle of threads. After hatching, the young climb onto the back of the mother and may remain with her for some time. They grow by moulting the outer layer of skin from time to time.

Wolf spiders often make turrets of grass and earth at the entrance of their burrows. These turrets serve as watch towers from which prey as well as enemies may be observed to better advantage. As in most other spiders, the sense of sight is poorly developed. After its luckless prey is captured it is sucked dry and the hard parts are left behind since only liquid food is taken into the mouth.

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for acquiring such fundamental information concerning the wonderful world about them, according to Superintendent of Schools William J. Bogan. He states that the course of study in science and Nature study for the first six grades of the public schools has been completed, and was put into effect all over the city when schools opened this year.

"This is the first time the Chicago elementary schools have had a graded course of study in science," said Superintendent Bogan, "although we have been trying to get it into the schools for twenty years, realizing that city children, and especially those who have little opportunity to spend summers or vacations in the country, are rapidly losing touch with Nature—with the flowers, the birds, animals and insect life—in short, with the whole world about them."

Miss Rose A. Pesta, assistant superintendent of schools, under whose direction the science courses were prepared, said in her report:

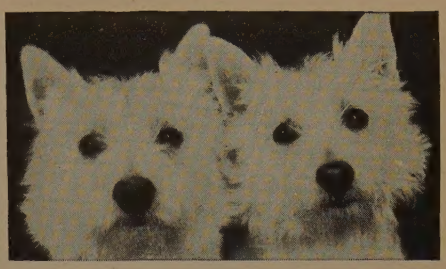
"One of the important things we hope to accomplish by establishing this course is to develop the observation of the children. They do not know the birds, the flowers, the weeds, the trees. They must be taught to see them and understand Nature in the same general way they are trained to read or to add. We want to give these hundreds of thousands of Chicago school children the opportunity to know the natural world, the animals, the vegetables, the stars, the seasons, to know and understand and be intelligent in such physical science in order that they may appreciate the beauties and wonders of the world in which they live.

"We want the child to develop a questioning attitude so he will ask 'Why is this so?' and to find out as much as he can for himself.

"We are getting away from the old custom of telling fairy tales in respect to Nature study. That was formerly done because many thought that this personification of abstract forces and inanimate objects would tend to make a child become interested, while telling him the truth and sticking to true science would simply bore him. But we have discovered that this was an error—that the truth, if properly presented in words and ways the younger pupil understands, holds his interest and arouses his curiosity far more than does the telling of fairy tales."

The new course of study in science, for example, for fourth, fifth, and sixth grades, teaches the child to distinguish many varieties of trees and birds, to become acquainted with their habits and life processes. It makes a somewhat detailed study from personal observation and questioning of such insects as the grasshopper and beetle; the child also becomes acquainted with flowers and weeds and their life habits.

This science and Nature study course is elastic enough to fit the very diversified neighborhoods found in the city of Chicago, and there are no minimum requirements for its completion. It is, in short, another step of educational progress in the introduction of living and natural creatures or objects, combined with their academic discussion.



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INDEX TO ADVERTISERS

BINOCULARS

Loring, J. A. 201

BIRD HOUSES

Dercum, H. 251
Packard, Winthrop 251

BOOKS

American Medical Association 247
Bird and Animal Paintings . . . 3rd Cover
Birds of the States . . . . . 3rd Cover
Encyclopaedia Britannica, Inc. 197
Forest Facts for Schools 250
Nature Almanac 246
Nature Binder 250
Our Disappearing Fur Bearers 248
Trees As Good Citizens . . . . . 2nd Cover
Wise, Wm. & Co. 199

EDUCATIONAL

American Landscape School 249
American School of Photography 201
Columbia University . . . . . Back Cover
Newspaper Institute of America 247
University of Chicago 249

GARDEN & ACCESSORIES

Bobbink & Atkins 245
Burpee, W. Atlee Co. 246
New Market Perennial Gardens 246
Peterson, George H., Inc. 246
Salbach, Carl 246
Stumpp & Walter Co. 245
Western Maine Forest Nursery 246

HOTELS

Bismarck Hotel 248
Chalfonte-Haddon Hall 248
Morrison Hotel . . . . . 2nd Cover
Piccadilly Hotel 246

MISCELLANEOUS

Bastian Brothers 249
Comfitape Laboratory 249
Gagnon Company 249
Glanz, A. 252
Madden, B. L. 249
Maple Grove Candies, Inc. 249
Metal Arts Co., Inc. 249
Polk, R. L., Co. 249
Wild Flower Preservation Society . . . 249
Wurster, C. Wm. 252

PETS & THEIR CARE

Bird Haven 251
Chappel Brothers, Inc. 251
Comrade Farm Kennels 251
Costa Mesa Bird Farm 251

PHOTOGRAPHIC

King Photo Tint Co. 201
Lee Sales Co. 201
Palko Camera Co. 201
Paramount Mfg. Co. 201
Willoughby Camera Co. 201

SPORTING GOODS

Bean, L. L. 249

TAXIDERMY

N. W. School of Taxidermy 251
Schmidt School of Taxidermy 251

TRAVEL

Cunard S. S. Line 200

House Wren—Ohio State Bird

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MACHINE DESIGN
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MATHEMATICS
MUSIC—HARMONY
PERSONNEL ADMINISTRATION
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